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ABSTRACT

INFORMATION IS PRESENTED REGARDING THE CURRENT TREND IN EDUCATIONAL FACILITIES PLANNING. DISCUSSION IS INCLUDED OF--(1) OUTSTANDING FEATURES OF AWARD WINNING SCHOOLS, (2) MULTI-STORY SCHOOLS, (3) RESHAPING SCHOOLS, (4) INNOVATIVE TRENDS, (5) DESIGN CRITERIA, (6) GEOMETRIC FORM, AND (7) COST FACTORS. EXAMPLES ARE SHOWN OF NEARLY EVERY STYLE OF BUILDING DESIGNED TO MEET THE DEMANDS OF MODERN ELEMENTARY AND SECONDARY SCHOOL PROGRAMS. DESIGN COMMENTARIES SUPPLEMENT THE PRESENTATIONS OF THE DIAGRAMMATIC DESIGN SAMPLES. (FS)

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This publication is presented to you as a complimentary gesture from the authors, Thern Associates, Inc. Its purpose is to provide the reader with the current trend in educational facilities planning. Although the floor plans and design commentaries involve plans prepared by TAI, background information has been included from other sources to increase the impact and interest in the subject.

Thern Associates have also prepared several video tapes of open-concept schools in operation, which have been viewed by many education-oriented groups with sincere interest. These films include subjective interviews with teachers, administrators and students, all unrehearsed and spontaneous. These video tapes are available for your Board or teachers organization, with our compliments. They do not represent building "commercials", as we are primarily interested in the program and function.

Our request is that you realize the time and effort which has made this booklet possible. Please use it for your personal information only.

THERN ASSOCIATES, INC.
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Special Note.......

Copies of this Publication have been included in the E.R.I.C. Clearinghouse files.

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- FOREWORD -

During the annual convention of the Wisconsin Association of School Boards in 1968, Professor James D. MacConnell, Director of Stanford University's School Planning Laboratory offered the following comments:

> "The program won't involve planning the building but rather, planning for the building. A school must become a tool of teaching and learning - this is the primary objective."

"Because new buildings will be geared toward teaching and learning, the schools will look different than the traditional 'egg crate' style."

> "The big job your people have to do is to tell them that things aren't what they were. The idea that things have changed just doesn't go over. They want their automobiles and houses different, but not education."

"Things are different now. We are trying to have everyone learn as fast as he can. We have never done this before."

> "The people we need to get to are in the rural area. They can't compete without the facilities. Those kids are not high school graduates - they are just alleged high school graduates. Wait until they hit the big time!!!"

The foregoing comments offered by an educational leader who is probably recognized as the most prominent of our time, serve as a very appropriate introduction to the material presented in this publication.

> We can attempt to close our eyes and ears to the changing concepts of functional education and the design changes resulting therefrom. But - we must ask ourselves the following question -----

ARE WE TRULY PROVIDING THE BEST BUILDING DESIGNS TO IMPLEMENT THE MOST EFFECTIVE LEARNING PROGRAM FOR OUR CHILDREN?

SECTION I

OUTSTANDING FEATURES OF AWARD WINNING SCHOOLS AS CONDENSED FROM THE NATIONS SCHOOLS MAGAZINE

Each year the Nations Schools Magazine publishes a report of the twenty outstanding schools in the nation for that given year and it is extremely interesting to notice the change in the judging of these facilities. We have taken what we feel are the highlights and condensed them for the benefit of the readers.

STANDARDS OF DETERMINATION

- Flexibility - must have movable and removable interior walls.
- Large and small group instructional areas must be provided.
- Simplicity in design rather than an elaborate and costly solution.
- Large materials center - ideally located in the center of the building.
- Sound control and separation of prime importance.
- Arrangements for provision of adequate space for new technological advances in equipment.
- Multi-use type areas for economy and function.

Although these features are not unknown to the average school board member and professional educator, they often seem to be lost in the design of the building. As a result, the educator is forced to operate a building without the functional features possible through alert planning.

BRIEF DESCRIPTION OF AWARD WINNING HIGH SCHOOLS - 1967

- Exterior window areas - 15 to 120 sq. ft.
- Average classroom size (Academic) 26 x 30.
- Average construction cost - $15.10/sq. ft. (exclusive of land, landscaping, design fees and equipment).
- Light level - 60 to 70 foot candles.
- Heating system (10 schools) - six had univents, four had a central system.
- Air-conditioning - three of the ten schools had provisions for future air conditioning.
- All units were severely judged on the Materials Centers.

AWARD WINNING ELEMENTARY SCHOOLS - 1967

- Six of the ten designs involved the circular concept.
- Featured movable equipment.

AWARD WINNING ELEMENTARY SCHOOLS Continued -

- Carpeting featured in many areas.
- Average construction cost - $14.00/sq. ft. (exclusive of land, landscaping, design fees, and equipment.)
- Classroom size - 30' x 30' (6 of 10 designs had wedge shaped classrooms).
- Heating system (10 schools) - seven had central systems, three had univents.
- Light level - 70 to 80 foot candles.

BRIEF DESCRIPTION OF AWARD WINNING HIGH SCHOOLS - 1968

- Exterior window areas - windowless to 180 sq. ft., average 60 sq. ft.
- Average academic classroom size - 26 x 30 (780 sq. ft.)
- Average construction cost - $15.80/sq. ft. (exclusive of land, fees, equipment, etc.)
- Average classroom light level - 60 ft. candles.
- Heating systems (10 schools) - five had univents, five had central systems.
- *Air conditioning (10 schools) - five included air-conditioning, five did not provide for air-conditioning.

  *Note - The schools which did not provide for future air-conditioning were all heated with uni-ventilators.

AWARD WINNING ELEMENTARY SCHOOLS - 1968

- Building shape (10 schools) - Four rectangular, two circular, and four polygonic.
- Exterior window area - 50 to 70 sq. ft.
- Average construction cost - $15.10/sq. ft. (exclusive of land, equipment, fees, etc.).
- Average square foot/pupil - 70 sq. ft.
- Average number of teaching stations - 20 units
- Light level - (classrooms) - 60 ft. candles.
- Flooring material - 7 of 10 schools used carpeting.
- Heating system - four, central system; six had unit-ventilators and two had air-conditioning.
- Average classroom size - 860 sq. ft.

"WHAT COUNTS IS NOT THE SHAPE OF THE SCHOOL, BUT, --- HOW WELL IT DOES WHAT IT SHOULD DO" *

- "HIGH SCHOOLS ARE SHAPELY" -

> "Secondary schools that are drawing oohs and aahs from educational palnners these days, still come in all shapes and sizes."
>
> "Perhaps the strongest common tie for the award winning schools --- and the measure of their success --- is that they 'work' in terms of the educational program they house."

- "BUT, K-6 SCHOOLS ARE SHAPELIER" -

> "Octagons, pentagons, hexagons: This years award winning schools are shapelier than ever. Behind the popularity of the polygons - the spread of the house plan to elementary cirriculums and a desire to cluster classrooms in small groups around shared multi-use and team teaching space."

* Nations Schools Magazine - January, 1968.

OBSERVATION:

There are many interesting observations one can gain from reading the complete report, but several are quite closely related to the material included in the remaining portion of this publication. We were particularly impressed with the following features:

- The trend nationally toward the reduction of window areas;
- Central heating systems are replacing unit ventilators;
- The emphasis on Materials Centers;
- The general comment concerning "Simplicity";
- The heavy use of carpeting;
- Less concern about noise - more open classrooms;
- The trend toward non-rectangular structural shapes.

SINGLE-STORY MULTI-STORY

Local factors often dictate the decision to build "up" or "out", but certain basic criteria can be applied to all types of school construction. They're explained here.

You can always think of lots of questions to ask the architect when it's time to build a new school. But there's one question that architects hear most often: "Should it be one-story or two-story?"

"Which is *cheaper?*" is often part of it. But the real key is all wrapped up in the answer to another question: "Which is *better?*"

To zero in on this problem, SM editors contacted Sherwood, Mills and Smith, Architects, in Stamford, Conn., who have had much experience in the school field. This article was prepared with their close cooperation; the schools used to illustrate various points were designed by them.

Cost not final factor

Most laymen and many educators, in their innocence, try to draw a comparison between home construction and schoolhouse design. They believe—and, in general, they're right—that a two-story house can be built for a lower square foot cost than a "ranch" structure.

But this generalization cannot be extended to school building, according to Lester Smith, a partner in the firm. Says Smith: "Though cost is the final and not the least important factor in schoolhouse design, it is the aggregate of many other considerations that have to be studied before a decision as to a single-story versus a multi-story school can be made. Each school construction project is unique and the physical and educational factors which determine the number of stories differ from case to case."

On the following pages, you will find an objective presentation of the factors Smith refers to.

FACTORS THAT DETERMINE WHETHER YOU BUILD "UP" OR "OUT"

Educational requirements

When all other things are equal, it is most desirable for younger children to be housed in a school on a single level. The primary school, in particular, should try to provide the child with an easy and natural transition from home to school. In many ways, the single-story school is more consistent with this objective. It is easier to scale to the young child's dimensions. Ceilings and entrances can be made smaller to subdue the impression of size. The child is constantly aware of such reassuringly familiar things as trees, landscaping and absence of height. Greater use of natural light is permitted, thereby lessening the institutional impact of some artificial lighting. When an extremely compact site forces the consideration of a multi-story school, planning should be aimed at placing older children on the upper levels.

Oddly enough, however, if an extremely large elementary school is planned, it is often better to consider two stories. Spreading a single-story school for young children over too large an area often gives an impression of vastness. Long corridors with unbroken wall surfaces have a tendency to awe the child.

Another drawback of the large, one-story school is excessive travel between classes.

At the high school level, children are usually as well served by multi-story as by a single-story building. The number of pupils to be accommodated is an important factor. A good rule of thumb to apply, barring unusual conditions of site, is that a student body of 800 pupils or less indicates a single-story structure; from 800 to 1,200 pupils there is an option; and for 1,200 or more, multi-story is dictated. It is also well to remember that secondary education usually involves travel between classes, and the multi-story plan keeps distances to the minimum.

Site size

The topography and geology of the school site are the most important considerations in determining what kind of school will be built, although the size of the site is also a factor. The practice recommended by most state education departments for elementary schools is a minimum of five usable acres, plus a minimum of one usable acre for every 100 students. For high schools, the general rule of thumb is 10 usable acres plus one usable acre for every 100 students. Contrary to common belief, multi-story construction doesn't save much land space (see diagrams below).

On the other hand, the single-story spread-out campus plan obviously would not be suited to a smaller-than-standard plot.

Topography is a critical factor. A flat piece of land lends itself well to single-story construction since all floors can normally be poured on grade, thus eliminating expensive floor framing and reinforcement. A sloping site dictates a combination of single- and multi-story—the so-called "split level."

Soil conditions are another consideration. Loose or sandy soil with poor bearing characteristics will complicate the foundation for a multi-story structure. On the other hand, excessive rock outcropping or hilly terrain will involve costly land moving, hence multi-story construction may become more attractive.

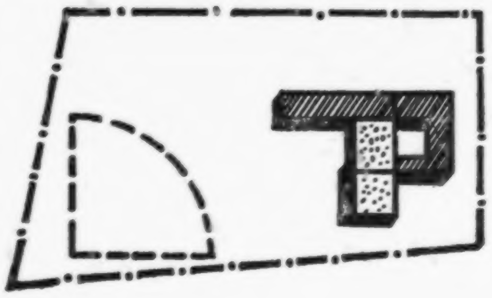
Climate

In most areas of the United States the generally temperate climate permits either single-story or multi-story school construction. Climate becomes a consideration, however, in the more extreme areas. A multi-story structure is generally easier and less expensive to heat than a single-story, spread-out building, and therefore would be preferred in colder climates. In a warmer zone, the single-story school building, with all indoor space directly connected to the outdoors, has positive advantages. The use of outdoor areas as classroom space is facilitated. Ventilation is simplified. Greater utilization of natural lighting is permitted.

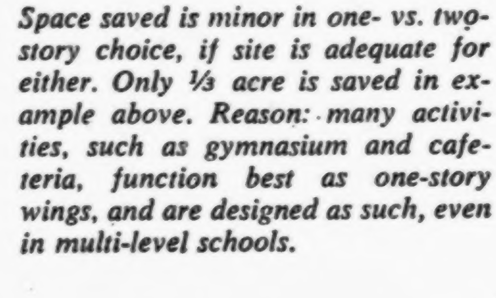
Safety factors

Without question, a one-story building is more quickly evacuated in the case of fire than a building

One-story school on 7½ acres.



Same site: two-story school.



Space saved is minor in one- vs. two-story choice, if site is adequate for either. Only ⅓ acre is saved in example above. Reason: many activities, such as gymnasium and cafeteria, function best as one-story wings, and are designed as such, even in multi-level schools.

two or more stories high. The lack of stairways also tends to reduce accidents.

Construction costs

To understand the detailed cost comparison on page 4, a basic understanding of the elements that affect cost is necessary. In building a school, these are the items that are important from a cost standpoint: excavation, foundations, framing, floors, stairs, exterior walls, roofing, heating, plumbing, air conditioning, electrical installation, and maintenance.

Excavation for a one-story school is more costly since a greater land area is involved. On the other hand, foundations for the single-story will be lighter, a saving that is somewhat negated by the fact that they must be longer. In general, the preparation of land and foundation favors the multi-story structure.

A definite advantage accrues to the single-story school, however, in the framing area, where lighter framework is required than for several stories. The same applies so far as floors are concerned. A single-story school requires somewhat less square footage of floor.

In the case of exterior walls, the two types of structures will be approximately the same, with a slight additional cost factor accruing to the two-story building. Roofing is a definite plus for the two-story structure.

Installation of the heating plant and plumbing favors multi-story, but fewer plumbing fixtures are usual in a single-level plant.

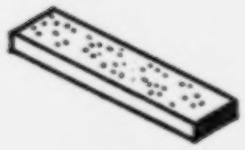
Air-conditioning costs are a negligible factor in determining the height of a school. Whether in a one- or multi-story structure, it is the air-conditioning *load* that counts.

Maintenance-wise, the single-story school favors such constant factors as window washing, painting, reglazing, general repairs and floor waxing. Heating, however, is cheaper when one builds upward.

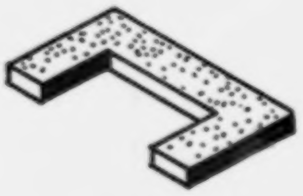
It is also important to recognize that expansion of a single-story school is easier. This is particularly true when the campus plan is involved.

WHICH BUILDING IS BEST FOR YOU?

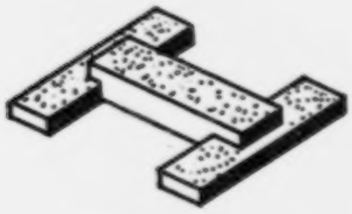
Educational and physical requirements of your school and site call the tune as to whether you build "up", "out", or "up and out." The shapes below represent a cross-section of designs that architects have used to fill individual school needs.



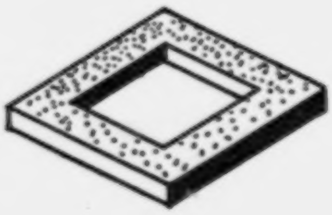
SIMPLE BAR



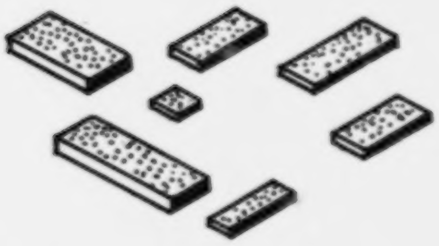
DOUBLE-WING



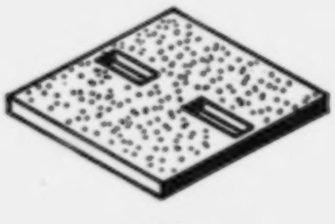
CORE WITH WINGS



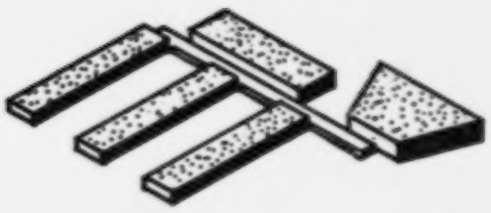
COURT



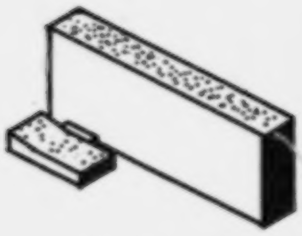
CAMPUS



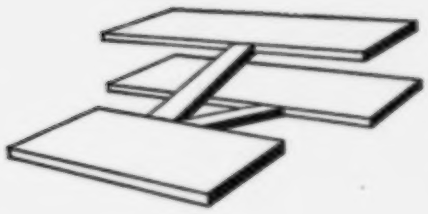
LOFT



FINGER



HIGH RISE



SPLIT LEVEL

Kindergarten activities (with auditorium, gym) are in one-story wing. Intermediate is second story; primary is on floor below.

STEP-BY-STEP COMPARISON: ONE-STORY VS TWO-STORY

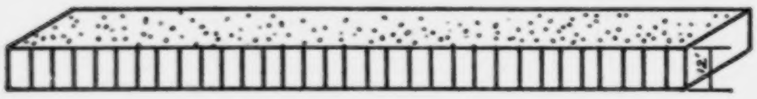
These simplified sketches show a typical 14-classroom wing using one- and two-story design. Facilities in each are about the same. The single-story structure has one set of toilet facilities at the far left, plus a storage room on the opposite side of the corridor. The two-story building requires two sets of toilets, one on each floor, plus two stairwells, one at either end of the wing.

The most apparent difference between the two buildings (see table) lies in the fact that the two-story structure requires 1,728 sq. ft. more space to provide an equal number of classrooms. For example, at $20 per sq. ft., the two-story structure starts off with a $35,000 handicap.

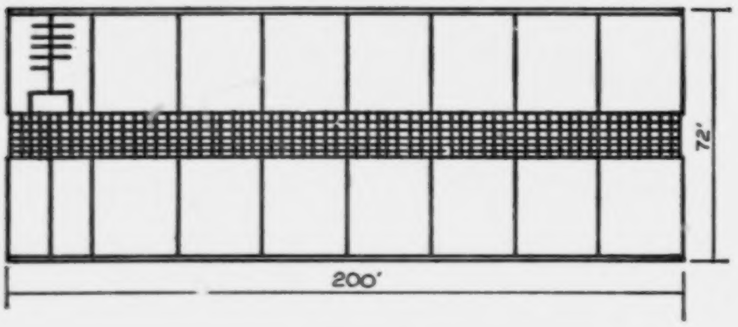
Under ideal conditions, excavation for the two-story building would be about $1,000 less than for the one-story building because of the smaller area involved. Roof area is also less, a considerable saving. This is counterbalanced by the greater exterior wall required in the two-story building and by the cost of building stairways.

The table below details the cost factors under ideal conditions where level land and good soil conditions prevail.

ONE STORY

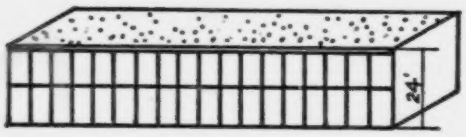


Elevation

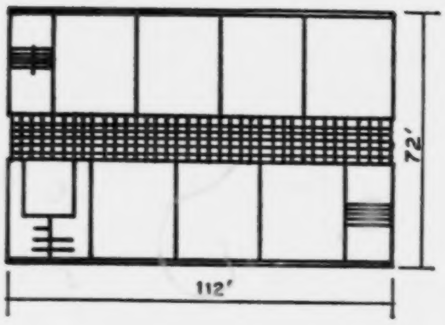


Floor plan

TWO STORY



Elevation



Floor plan

Physical cost factors in one- and two-story construction

	ONE-STORY	TWO-STORY
Excavation	More costly	Less costly
Foundations	Light but long—cost about same	Heavy but short—cost about same
Framing	Lighter—less costly	Heavier—more costly
Floors	14,440 sq. ft.; cheap ground floor	16,128 sq. ft.; costly second floor
Stairs	None—no cost	Two required—costly
Exterior walls	6,528 sq. ft.—less costly	8,832 sq. ft.—more costly
Roof	14,400 sq. ft.—costs more	8,064 sq. ft.—costs less
Heating	Costs more	Costs less
Plumbing	One set of toilets—costs less	Two sets of smaller toilets, slightly more
Electrical	Same	Same

EXCERPT FROM THE WALL STREET JOURNAL
Dated: Feb. 13, 1968

RESHAPING SCHOOLS

NEW DESIGNS INCREASE FLEXIBILITY OF TEACHING, SOMETIMES SAVE MONEY

MOVEABLE WALLS PERMIT CHANGE OF CLASSROOM SIZE: WASTE CORRIDOR SPACE ELIMINATED

SUPER-AQUARIUM GETS CLOGGED

By Richard D. James
Staff Reporter of The Wall Street Journal

St. Louis - When Karen Koch, then seven, first saw the building in 1966, she asked: "Is this really a school?" recalls Principal Lee Koch, her father.

A lot of people have that initial reaction when they see Valley Winds Elementary School here.

The squat, tan-brick school, now three years old, has a floor plan that resembles a snail shell. It has no hallways; 21 doors spaced along its curved outer wall open directly into the school's classrooms. One classroom is as big as six ordinary schoolrooms; three others are triple the average schoolroom's size. Thick olive and beige carpeting covers the floors.

A wedge-shaped reception area with administrative offices is just inside the building's main entrance, beyond the covered playground that occupies the flared end of the building. Near the center of the school an indoor stream meanders between a hemispherical library and study hall area and a 300-seat auditorium.

"Originally, the stream was to have been a super-aquarium where children could study fish and marine plant life," says Mr. Koch. "But fuzz from the carpeting clogs up the pump, and there isn't enough natural light to keep anything alive. I'd like to fill it in and have the additional floor space." That's about the only architectural change he would like to see in the building.

He feels the other features - designed to facilitate team teaching, encourage independent study and permit use of electronic teaching aids - are a huge success. That view seems to be shared by Valley Winds' 21 teachers and 530 students, as well as by a number of educators and architects in other cities.

New schools throughout the U.S. are veering dramatically from the traditional "egg crate" pattern of school construction. An elementary school in Greeley, Colo., consists of four big circular classrooms that can be partitioned off into wedge-shaped sections. Greeley's new high school is made up of odd-shaped classrooms within big triangular sections. Alcoa, Tenn., has a hexagonal high school in which diamond-shaped, double-sized rooms can be divided by folding walls.

CIRCLES ARE CHEAPER

It's anybody's guess how many of the estimated 2,100 elementary and secondary schools built last year in the U. S. incorporated such odd shapes in their designs. But in California alone, 50 of the 250 schools built in 1967 boast such features as movable walls and double-duty auditoriums, says Charles D. Gibson, chief of California's school planning bureau.

Architects and school officials say the new-style schools are no more expensive than conventional ones. "There's no evidence that a premium has to be paid to get the new designs," says Harold G. Gores, president of Educational Facilities Laboratories, an arm of the Ford Foundation.

Sometimes it even costs less to build an odd-shaped school. Valley Winds' construction cost, complete with carpeting, ran just over $1,000 a pupil in 1964, well below the $1,400 a pupil average cost of school construction at that time in Missouri, Kansas, Nebraska and four other Midwestern states.

Exterior walls are a major expense in any building, and a large chunk of Valley Winds' saving reflects the fact that it takes about 25% less outside wall to enclose a circle than a rectangle embracing the same area. Another major saving resulted from the absence of long corridors, which take up about 20% of the floor space in a conventional school building.

A BIG LIBRARY

But cutting costs isn't the primary aim of the new look in schools. The objective is to make them more functional - "to get the building out of the way of education," as John Shaver, a Salina, Kan., architect puts it. "We visualize how teachers and students would group themselves if unencumbered by walls, then we set these groupings down on paper and shape a building around them," says Mr. Shaver, whose architectural firm has designed schools in Colorado, Indiana, Missouri, Kansas and Tennessee.

One of them is a high school now under construction in Lowell, Ind. It has a floor plan made up of three circles, roughly resembling the outline of a snowman. The biggest of the circles contains three clusters of classrooms - one for science courses, one for English and foreign languages, one for social science classes. Each cluster has its own small library. The two smaller circles of the snowman contain a gymnasium and swimming pool.

The school's 15,000-square-foot main library is centered among the classroom clusters, taking up about 7% of the school's floor space. By comparison, a typical library in a high school built in the 1930's occupies only about 3,000-square-feet, only about 1% of the floor space in most older schools.

At Greeley's Sherwood Elementary School, the library area is surrounded by four big, circular classroom areas that can be cut into sections with movable walls. The library is handy to all classes, and, explains a Greeley public school official, "There's high correlation between a library's accessibility and its utilization."

Teachers at Sherwood say they are able to let more students leave class to study independently in the library because it is so close by they can check up on the youngsters easily.

Folding partitions divide each of Sherwood's areas into as many as six separate classrooms. During a typical day, the partitions will be folded out of the way for a choral music class in a single, circular classroom 100 feet in diameter. One teacher takes charge of the 180 third and fourth graders while the other five teachers grade papers and prepare lesson plans.

When it's time for English, the partitions are closed around pupils grouped according to their skills. Later, two of the partitions are opened, and the fourth grade classes are combined to watch a science program broadcast by a Denver educational television station. "One of the biggest advantages of this school is its flexibility," says Wilma Scott, principal.

Team teaching isn't emphasized at Evans Junior High School in Greeley, another school designed by Mr. Shaver; hence, few of its classroom walls are movable. Evans consists of 10 circular brick sections, each opening onto an enclosed central mall. One circular section contains the gym, others contain classrooms, teachers' offices, a library and a combination cafeteria-auditorium.

The layout bewilders new students for a few days, says Don Kelley, a vocational counselor. "New seventh graders, especially, have trouble finding the restrooms," he says. "We give everybody a map to help orient them."

The year-old elementary school in Millbrae, Calif., a San Francisco suburb, is a long, low, frame building with no interior walls. Its area equals 16 conventional classrooms. The school's 300 pupils eventually will attend un-graded classes (children aged six through eight already do), and most of the classwork at Millbrae already consists of semi-independent study by groups of five or six students, says Eleanor Oleson, principal.

The school's design, she explains, allows each student to join a group working at his level in each subject. A child can be promoted- or demoted - in any subject at any time of the school year simply by being moved across the room to another group. "It erases completely the stigma of, say, a third grader working at second grade level" in some subjects, says Miss Oleson.

She says that before the school opened, Millbrae teachers worried about noise and feared youngsters would be inattentive. "But we find the majority of children are really developing powers of concentration that amaze us," she says. Carpeting and acoustical ceilings soak up much of the noise, she adds.

Many of the new schools have cafeterias and auditoriums that do double duty; they accommodate large audiences, then can be partitioned off into sections for smaller groups.

Candlewood Junior High School in Half Hollow Hills, Long Island, New York, regularly uses its theater-in-the-round for dramatic productions. But at the touch of a button four electrically operated partitions slide out and meet at center stage, dividing the auditorium into four lecture halls, each seating about 170 persons.

South Mountain High School in Phoenix doesn't have an auditorium. But it is planning to build one that will be ringed by four lecture halls that pivot on electrically operated turn-tables, so that the halls are sometimes part of the auditorium and sometimes separate rooms. The main hall will have 600 seats, and each lecture hall will have 200 seats. Up to 1,400 students will be able to attend big events, or the lecture halls can be turned away from the main auditorium so that up to five smaller groups will be able to use the facilities. "We'll be able to use the auditorium space 80% of the time, compared to about 20% otherwise," predicts Howard C. Seymour, Phoenix school superintendent.

Courtyards and student lounges are showing up in more new schools. Carlsbad, N.M., High School has a 35-foot-by-150-foot courtyard in the center of a horseshoe-shaped classroom building. A translucent plastic roof covers the courtyard, which contains a small waterfall and reflecting pool, pine trees, ivy and benches.

"It's a place where pupils can come to exchange ideas," says William W. Loos, principal. "The kids use it all the time. They appreciate the beauty, and, while I'd hate to have to prove it statistically, we believe the whole idea has made for a better academic environment."

- THE INNOVATIVE TREND -

INTRODUCTION:

All educators realize that schools are changing at an accelerated rate than ever before experienced in our history of education. Fewer board members and designers are aware of the true impact of new methods such as Team Teaching, Flexible Modular Scheduling and the Open Concept. Children are on the move!!!! Our buildings must be designed to allow this movement with a maximum of ease.

In many examples, the school program does not include the "pure" form of any of these methods, but, they do include modified attempts to reach the same goal - better education for the individual child. The classroom teacher is commanding greater respect in the community through increased salaries and a stronger voice in school affairs. By the same token, the parents and Board Members expect more from the classroom teacher. The physical space and teaching tools available to the teacher are the prime determining factors in the success of this goal along with the basic skill of the teacher.

We have all heard the argument in individual districts that the teacher cannot adjust to the new methods and therefore, the education for the children must remain static. When we discuss this problem with progressive administrators, they are not concerned because a progressive program will attract progressive teachers. In the end result, the children will benefit from this progressive approach. In larger districts where teachers have been given an opportunity to "volunteer" for new teaching assignments in innovative facilities, the result is always the same --- the stronger educators are the volunteers.

The teacher is faced with a challenge - the designer is faced with a greater challenge - to provide a facility which is modern, innovative and acceptable to the community. Sometimes the matter of being acceptable to the community takes precedence over education and this is not fair to the children. We must educate the adult as well as the child, as we can no longer afford to accept the old "red brick" building as the image of modern day school. The new school may not have four walls --- it may not have any walls!!!

THE EDUCATIONAL "SUPERMARKET":

The term "supermarket", when applied to education, obviously does not enhance the image of our modern education of today. If we could close our eyes to the connotation that the "market" applies to the classroom teacher, but rather, we are speaking of the physical plant alone - a different picture developes and one that expresses the modern trend in school design, whether we like it or not. At the present time we speak of the anticipated life-span of a new school in terms of 60 years or more. We design for maintenance, public acceptance, teachers whims, etc., but --- do we design for the future?

THE EDUCATIONAL "SUPERMARKET", Continued-

It is remotely possible that twenty years from now our schools will return to the "egg-crate" shape to which we are accustomed. Our pace of living must also do an "about-face" and proceed at a slower rate. Will this actually happen?? Let's face the total possibility that it will not! Then our modern method of educating our children will not alter from it's present course.

We do in fact require "supermarkets" of education as the term would apply to the modern physical plant of brick and mortar. We need open spaces which can be changed without the use of concrete hammers and dynamite. When we visualize the food-type supermarket, the image is one of open space with the absence of solid walls and protective "cells". Particularly for the upper grade levels this same image is rapidly being associated with the physical appearance of the modern school. Most professional educators realize and accept this fact, but, how do we convince the school board member and the elector?

Dr. Harold B. Gores, President, Educational Facilities Laboratory, made a rather surprising statement before the assembly of educators in Palo Alto, when he declared - "The small school district has the power to be innovative, whereas, the larger school is lost in a sea of tradition, tranquility and compromise. The city schoolhouse, new or old, represents the municipal mind at it's cruelist. It is a strange phenomenon - individually, we like our children, but as groups, - as governments - we don't."

If one reflects on this statement for a moment, it becomes readily apparent that many of us fall into this trap of being traditional.

THE ROAD TO INNOVATION

Whenever the term "innovation" is presented to a Board of Education or audience of taxpayers and electors, another image comes to mind --- it's going to cost more money. - This is not true and there is no foundation for this belief. In a conservative state, like Wisconsin, it is extremel difficult and in fact, painful for an educator to be innovative. He must confront the public with a complete change and he must convince them that he is thinking of the children --- not of his own personal gain.

The designer has an equal problem when in a sincere and dedicated effort, he too proposes change. Change in building shape, change in function and change to produce a facility which has a better chance of being functional at the end of those sixty long years. His competitors (the out-moded ones) use his designs as an abstractionist target; the public demands to know why; and the teachers say that it won't work. The obvious response is to slip back into the oblivion of tradition and forget the children.

THE ROAD TO INNOVATION: Continued-

Recently, John Shaver, Architect, spoke before a nation-wide group of educators gathered for a meeting of what was then known as the National Council of Schoolhouse Construction. He explained the motivation behind the new and exciting schools in Greeley, Colorado, some of which involved circles, pods and hexagons. Immediately, he was challenged by a member of his profession concerning the merit of his designs and the obvious cost figures presented. Mr. Shaver asked his critic, "Have you ever designed a circular or hexagonal school?" The response was negative. Mr. Shaver then advised his critic to design one and then, at a later date, repeat his question.

> This probably represents the direct answer to the cirtics of innovation. Criticism must be qualified and if a critic has no experience in innovative designs --- his criticism cannot be taken seriously. We have altogether too many critics who are not experienced in the subject. Experience is the best teacher and it is fool-hardy and ignorant to criticize without direct knowledge. We have encountered designers recently who have literally boasted that "Schools have not changed in the past 40 years, and what was good enough then is good enough now". A statement very much to the liking of the unsuspecting taxpayer.

It takes intestinal fortitude to be different, to be innovative, to be modern, to be dedicated.

Can we expect our children to be sheltered from the innovative trend that has become the by-word of progress in our nation today? Rather than shelter our youth, we had better prepare him for today's world - Our schools represent the only direct vehicle in this preparation.

INNOVATION THROUGH FLEXIBILITY:

6:3:3; 8:4; 6:2:4; 6:2:2:2; 4:4:4; and other mystical arrangements are not Canadian football defensive formations, but rather they represent the many varied "grade" separations of our school children. Imagine the confusion when the first brave soul proposed a non-graded system. Imagine the delemma of the designer when he found he could not label his little "cells" with first grade, second grade, etc. Imagine further the conglomeration of designs that resulted from this sudden and abrupt change.

> The non-graded system and the approach to team teaching can be seen as the direct cause of the designer's look at flexibility. Obviously, the egg-crate would not work effectively under the team approach, and the non-graded system caused more "headaches" to the designer. In a period of several short years, the term "flexibility" held a mystic charm for educators and the effect on the designer was devastating. How can we support a roof with no walls?????

- THE DESIGN CRITERIA -

ELEMENTARY - MIDDLE - JR. HIGH - SR. HIGH

Elementary Schools, Middle Schools, Jr. High Schools and Sr. High Schools all have one common denominator as related to the current trend in education - they must allow complete flexibility and fluid traffic patterns for the child. The theory that the child must lead a "sheltered" life in the lower grades and then passes through the transition period of the Jr. High School to the ultimate open education of the Sr. High School has been battered from pillar to post. A look at the change in teaching methods and curriculum will bear witness to the fact that the classroom is no longer a sanctuary - it is an exciting and stimulating place to learn --- alone and with others.

THE ELEMENTARY SCHOOL.......

Team-teaching, non-grading and accelerated learning have slowly but surely made their affect obvious in the elementary school of today. It is not uncommon to find open classrooms, large and small group instructional areas, mathematics laboratories, science laboratories, separate music facilities and materials centers in the modern K-6 facility of today. We can go back less than eight years and find these facilities missing in the majority of our elementary schools.

The materials resource centers in the modern 20 classroom elementary school of today far surpasses the facility provided in the high school a decade past. The elementary facility is larger and more complex with electronic devices unheard of in the high schools of the 1950's. The fact that these facilities are available to the child clearly indicates that these children are on the move within the school. They no longer remain in a 30 x 30 cell for six hours per day and nine months per year.

The teacher turns a key in the wall and a massive wall moves open and suddenly the 30 x 30 cell becomes an open area of 60 x 30 with two classes enjoying an educational movie or T.V. program. The classroom cabinets on casters are located at the whim of the teacher and they may be used to create a small classroom within a classroom. Groups of three, four or five teachers are in a team room discussing the next days lecture and selecting the prominent teacher to present that lecture. The A-V equipment available to the teaching team resembles the central panel of the early missile guidance system.

In the materials center the individual child is seated at a study carrel in complete concentration with a tape recorder describing the life cycle of a butterfly. In another area of the materials center other children are discussing the wonders of the solar system which they are viewing on an automatic slide projector. There may be several teachers moving about observing the children's progress and giving individual attention to the child in need.

THE ELEMENTARY SCHOOL (Cont.)

Even the chalkboards are movable and each room takes on a completely different appearance as the innovative teacher interchanges tackboard, chalkboard and shelving. Another teacher has divided her room into alcoves with the movable classroom cabinets.

No longer does the classroom have to serve as the coach, art teacher, scientist and mathematician, etc. Through cooperative education agencies, even the smallest school districts have specialists available to carry forth these programs in an effective manner. That is - if the proper facilities have been provided within the school. It is unfortunate that we parents don't take the time to really observe what a fine, progressive school can do for our children as opposed to the sheltered life of the old red brick building.

THE MIDDLE SCHOOL - JR. HIGH.......

The transition period between the relative tranquil security of the elementary school and the competitive atmosphere of the high school is expected to occur in the Middle or Jr. High School in a period of two or three years. This phase of the child's education poses the critical period of self-adjustment where the sense of security is transplanted by the desire to learn through the investigative process. The laboratories are more complete, the homeroom teacher is not with the child for the full six hours of each day. Extra curricular activities begin to take form and the child approaches the critical period of the "in-between" years.

If the facilities have been designed properly, the warmth of the elementary school will combine with the excitement of the high school to serve as the first real self-stimulant to the childs learning process. There will be more time for independent study, more time for small group discussions and experimentation. The laboratories will be more complete and individual projects will take form.

The fluid movement and traffic patterns afforded within the building will be of prime importance with the ability to control and supervise this movement of absolute necessity. No longer will the classroom teachers accompany the class to the gym, to the lavatories or to the cafeteria.

The school facility will be larger with more space allotted per child. Classrooms will vary in size with small seminar rooms, standard classrooms and possibly, a little theatre for the larger assemblies. The cost per pupil will also increase because of the many departments provided to supplement the standard classrooms. Open areas, folding walls, movable partitions, will become more abundant. The cost of equipment will increase because of the stimulated curiosity of the child engrossed in the transition to the independent study habits.

THE MIDDLE SCHOOL - JR. HIGH (Cont.)

Gymnasiums, locker and shower facilities, outdoor athletic facilities will also undergo a change with the increased emphasis on competitive activities. A student newspaper may take form and facilities provided for this activity in the immediate area of the commercial suite.

To the designer, the Middle or Jr. High School represents the greatest challenge because he is faced with providing a facility which must have the intimate atmosphere of the elementary school,yet allow the individual freedom necessary to provide the transition. It is no wonder that there are so many different approaches to the design of the transitional facility and it is equally gratifying to visit many of the modern schools that have represented the answer to this challenge.

THE SENIOR HIGH SCHOOL ....

Never before in the history of education has the Senior High School faced the severe test that is presented by today's society. We must train students for college-level work. We must offer vocational training for those who do not continue on to college. In short, we must make available the maximum amount of education to each child in a three or four year period. Never before has flexibility been so important as it is at the high school level.

Two or three years ago we were confronted with the sophisticated electronic learning devices and we began to provide electronic materials centers as a replacement for the library. Gymnasiums began to lose importance as the focal point of the school and Science, Math, Vocational Education Labs and Materials Resource Centers captured the center of attention.

Flexible Modular Scheduling was a little known concept that gained publicity in Nova and Stanford but was virtually unknown elsewhere. Now, we find ourselves caught up in the rush to create the atmosphere conducive to learning that has already enveloped other areas of our country.

The old standard one hour class sessions is rapidly being replaced by 15 and 20 minute periods. No longer does the educator have to stop a lecture at the critical point because some time clock activated the program bell system. In fact, there may be a complete absence of bells entirely and there are many teachers who would welcome this change.

The central materials resource area is already becoming obsolete with the advent of the house type system. For example, the English, Social Science, Speech and related subjects may be isolated in one "house", pod or ploygon with a materials center located in the focal point of the house. This house may gain the title of "Humanities" and a student may spend his entire academic day within one house. The Mathematics and Science laboratories along with the related materials resource center may be located in another house aptly titled the "House of Related Sciences".

Satellite materials centers are found in the most uncommon places in the modern high school. We may find one in the music department, another in the industrial arts, and still another in the domestic science suite.

Seminar classrooms, large group instruction areas, and little theatres are common to the modern high school. The swimming pool, which had been considered as a luxury, is rapidly gaining recognition as a functional teaching station of great value both to the community and the student.

Greater academic freedom can be found as depicted by the frequent small group discussion sessions that can range from sex to the proper planting methods for maximum yield of a corn crop per acre. Even the librarian no longer calls for complete silence and she recognizes the value of cooperative study habits and the blending of ideas.

The high school educator has more time for preparation and, once again the team approach proves to be of value to the student and the teacher. The teacher can press a call button and request that the computer programmer arrange for the latest chemistry demonstration to be programmed to the classroom via closed circuit television. The student in an electronic study carrel may call for a lecture that he missed due to an illness. A team of teachers may be engrossed in a critical evaluation of a T.V. demonstration prepared for presentation to the advanced chemistry class.

This is learning as we have never known it before and there are more innovations in the experimental stage that will make our present day offerings appear as outdated as those available a decade ago.

Not all school districts will be able to afford these sophisticated systems and methods, and the majority will not. However, we as designers and educators must make every effort to assure the students of the finest facility available within the means of the district. Innovative schools do not necessarily cost more as far as the cost of construction is concerned. In fact, many of the open-type facilities are considerably less expensive than the old closed type, corridor dominated facility of the past.

The point to consider is that an open school can always be converted to the closed type at a minimum cost -- the closed type may be converted to the open type but always at a maximum cost. In other words, it is easy to step backward, but difficult to move forward once tradition has controlled the design.

- THE GEOMETRIC FORM -

INTRODUCTION:

Most of us think of the rectangle or square when we relate a school building to a geometric form. We are used to the traditional box type structure but does this structure actually adapt itself to every modern form of education? We all realize that the methods of education are changing --- would it not be reasonable to expect our school buildings to change in a like manner?

In consideration of the basic geometry as related to the school building, we find that the rectangle and square do not represent the most efficient building shape. This lack of economy becomes evident in the initial cost as well as the long term cost of operation. Why then do we see so many rectangular plans and so few hexagons and circles? Again, the answer is simply because of the lack of familiarity on the part of the designer with the geometric intricacies of these new forms. It might be of value to consider the geometry of the circle and hexagon at this point.

BASIC GEOMETRY:

If, as a matter of comparison, we consider a total building area of 60,000 square feet, we will have a basis to examine the differences between the square, circle and hexagon. We cannot compare the rectangle because of the lack of symmetry, however, it is a matter of fact that the rectangle cannot be as efficient as the square as proven by basic geometry.

Example: The Square . ...
Area = 60,000 Sq. Ft.
$\sqrt{60,000}$ = 245 Ft.
$\therefore$ Since the sides of the square are equal
Each Side - 245 Ft.
$\therefore$ The perimeter = 4 x 245 Ft. = 980 Lin. Ft.

Example: The Circle ....
Area = 60,000 Sq. Ft.
Perimeter = $2\pi r^2$
$\therefore r^2$ = 60,000/3.14 - 19100
r = 138 Ft.
Perimeter = 2 (3.14) (138) = 867 Lin. Ft.

Example: The Hexagon .. ..
Area = 60,000 Sq. Ft.
Perimeter = (6 x S)
S - (60,000/2.598) = 152
Perimeter = 6 x 152 = 912 Ft.

COMPARISON:

For 60,000 square feet of floor area .....

The perimeter of the square = 980 Lin. Ft.
The perimeter of the circle = 867 Lin. Ft.
The perimeter of the hexagon = 912 Lin. Ft.

Percent of difference ....

The Circle = 980 - 867 = 113 Lin. Ft.
113/867 = 13.9%

The Hexagon = 980 - 912 = 68 Lin. Ft.
68/867 = 7.45%

CONCLUSION:

For an assumed total floor area of 60,000 sq. ft., the circle has 13.9% less outside wall area than the square. The hexagon has 7.5% less outside wall area than the square. If compared to the rectangle, the percentage reduction will become much more impressive.

Square	Circle	Hexagon
Face Brick	14% less	7.5% less
Back-up Block	14% less	7.5% less
Roof Facia	14% less	7.5% less
Roof Soffit	14% less	7.5% less
Ext. Foundation Wall	14% less	7.5% less
Exterior Footings	14% less	7.5% less
Reinforcing Steel	14% less	7.5% less
Heat Loss	8% less	4% less

Although these figures may not seem significant, we must remember that when a contractor prepares his bid, he does so on the basis of the material required. He then applies those unit figures to his standard labor scale which would indicate that savings will be realized in both material and labor.

- THE COST FACTOR -

INTRODUCTION:

Both the hexagon and the circle represent compact designs although this may be questioned because of the cluster configuration of the hexagon. In both examples the corridor areas are at a minimum and there is little problem with loss of continuity. As explained earlier, the circular plan will represent the greatest saving when considering the reduction in the exterior wall area and the total compactness of the design. The hexagon, although not as compact, offers other advantages not common to the circle or the polygonic form.

THE HEXAGON:

If the basic hexagon is used in a series of clusters or pods, thus encompassing a central core area, the economy becomes increasingly advantageous. Actually, as discussed earlier, the hexagon will encompass a greater usable area with a reduction in perimeter wall area. The general contractor is confronted with a series of buildings of equal size and similar framing. As the first section or hex is constructed the other sections or pods are merely repetitive of the first section. This repetitive process tends to eliminate what night normally appear to be a problem in lay-out and construction. Although an entire system of roof framing is involved, the structural components of each hexagonal would normally become a carbon-copy of the preceeding unit. Whereas more layout time would be involved for the first unit, each subsequent unit can be constructed with increased efficiency.

Because of the open nature normally found in the hexagonal design, there are fewer bearing walls and the building can be enclosed at a rapid rate. Again, there are fewer interior walls and actually we are merely providing an outside perimeter and a roof and floor system. The problem of roof drainage is not as easily handled as opposed to the circle and rectangle.

The contractor has an option in the fact that he can proceed with each pod as a separate structure, and thus confine his work to a smaller area - or - he can carry the entire building as one unit. The smaller unit type construction could present obvious advantages during the cold weather season as the temporary heating would be much less expensive.

The entire key to the economy of the hex, or any other building type, is the roof framing system. If the design, due to lack of experience or for some other reason, involves a framing system too complicated for the contractor - there will be problems both in construction and cost. Many of these problems can be eliminated through thorough preliminary planning with the aid of a competent structural engineer. Unfortunately, the structural design is sometimes attempted by unqualified designers and the results can be costly and highly aggravating to the Owner.

THE HEXAGON: (Cont.)

It is questionable as to the time of construction required, however, the hexagon will not proceed as rapidly as the circle, but may surpass the time required for the rectangular structure. The open aspect of the design will be of value in the reduction of construction time.

Mechanical contractors will find many advantages because of shorter conduit and pipe runs and a sharp reduction in the number of individual units required to heat the building. Once again, the central air handling system would appear to be the most economical particularly with the inclusion of air conditioning, either immediately or in the future. The hexagon represents an ideal challenge to an efficient indirect lighting system and this is the method most commonly employed in the California schools. The compact nature of the building will also reduce plumbing lines and with the flexible acoustical tile ceilings most of the plumbing, electrical and heating runs will be found in the ceiling, and all will be directly accessible for future change and maintenance. Once again, economical advantages are found because of the repetitious nature of the clustered pods and the mechanical contractors gain in a manner similar to that of the general. In the end result, it is the Owner who realizes the cost savings and the children who benefit from the functional advantages.

THE CIRCLE:

The trend of today and tomorrow will be toward the compact design largely because of the apparent cost advantages and secondly, in recognition of the need for air conditioning. We all hear more talk and results of studies concerning the operation of our schools on a twelve month schedule and when this change does occur - we will have air conditioned schools.

Thus, the circular school does present a strong argument because there is no equal to a circular school with regard to compactness of design. We have already considered the surprising reduction in outside wall area and the reduced corridor space required for the school-in-the-round.

Recently an article appeared in the publication sponsored by the Wisconsin Association of School Boards in which the author indicated that a circle will be more expensive because of the special materials required for construction. If the circle is of adequate size (approximately 30,000 sq. ft. or larger) there are no special materials required. Obviously the circle cannot be economical if the contractor has to use special block, brick, and other building components. The simple truth is that he does not. We often lose sight of the fact that the degree of curvature in a building having a radius of 100 feet or more is extremely slight. Statements to the contrary come from ignorance and lack of knowledge of the subject.

THE CIRCLE: (Cont.)

The method of project layout with the circle is totally different from the conventional building in that batter boards and string lines are eliminated. The contractor establishes a central control point in the middle of the building and with radial wires and transit he can establish every wall and joist location from that point. The mason no longer works with a stringline stretched from corner to corner because --- there are no corners. Instead he uses a template and radial line and each mason can work totally independent of his companion. Experience has proven that the mason can lay block at a more rapid rate in this manner as opposed to the conventional method. The proof of these statements can be readily obtained by discussing this matter with a general contractor who has built a circular structure from a well conceived plan.

The same architect mentioned that "A circular school will cost more than the conventional if the same materials and mechanical systems are used". If this statement is carefully analyzed, it becomes obvious that the author had not given the matter much thought - or - he allowed personal prejudice to take precidence over sound logic.

As there are many building types and shapes, there are also many varied types of mechanical systems. The circle offers one obvious advantage in air distribution, (heating and cooling) because it has one continuous corridor which may serve as an excellent plenum. Whereas, with a unit ventilator type system all piping must follow the perimeter. Therefore, the length of the piping runs are reduced by as much as 50 to 75 percent. The unit ventilator type system does not belong in the circular school if economy and function are of prime concern. The central air handling system provides an ideal solution for either immediate or future air conditioning, whereas, the unit ventilator cannot provide this function. Again, a visit with a mechanical contractor who has had experience with the circular design will be beneficial to separate fact from fantasy.

The electrical system can also be greatly simplified through a main power loop type of distribution. Again, we experience a decrease in the amount of material and labor involved in the circular school. The work can proceed at a more rapid rate similar to the increased pace of construction experienced by the general contractor.

Many articles have been written concerning the cost factor associated with the school-in-the-round and one of the most recent appeared in the Wall Street Journal, February 13, 1968, which in part indicated the cost reduction possible with the circular design. Our experience has provided valid proof of the fact that if designed properly, the circular school will cost at least two dollars per square foot less than the rectangular building with the same basic academic facilities. There will be more usable academic space in the circle as opposed to the rectangle of identical size.

SUMMARY:

There will always be those designers who are skeptical about the non-conventional type building and those ill-advised professionals may speak with a loud voice. However, most responsible professionals will not condemn a building type or style unless they have a working knowledge of the subject. Here then we have the answer to the critic --- have you ever designed one?

TURN-KEY CONSTRUCTION
for
PUBLIC SCHOOL CONSTRUCTION

FOREWORD........

No facet of school construction has created more interest during the past several years than that of Turn-Key proposals. On the surface at least, it would appear that the Turn-Key method of construction represents the panacea for all ills suffered by School Boards when faced with the bothersome task of constructing additional school facilities. The purpose of this brief look into the Turn-Key venture is to pose the following question -

DOES TURN-KEY TRULY REPRESENT THE "ASPIRIN" WHICH WILL CURE ALL CONSTRUCTION HEADACHES AS RELATED TO SCHOOL BUILDING PROGRAMS?

Architects not in the main stream of current thinking scream that the Turn-Key is a fad which will fade away.

Developers (Turn-Key) say that this method is in pace with society and is the only way to go

Responsible designers realize that the Turn-Key method is here to stay but not as related to all Owner situations of which, public works including school construction, is highly debatable.

One fact that cannot be ignored by alert designers is that they have inadvertently fed "life" into the Turn-Key concept because of their own failure to perform.

THE ORIGIN OF TURN-KEY.....

The Turn-Key method of construction is not completely new as some developers would have us believe. Many contractors have offered private industry the complete service of designing, building and financing which is the Turn-Key approach. Only more recently have developers found loop-holes in our laws concerning public works and competitive bidding requirements. The result is that new School Board members and Administrators find themselves confronted with an attractive method of evading, at least temporarily, problems that have plagued them in past building programs.

- Housing and Urban Development:
No single agency has given more nourishment to the Turn-Key method of construction than the Department of Housing and Urban Development, more commonly referred to as H.U.D. Low rent housing, as sponsored by H.U.D., has given the construction industry a tremendous "shot in the arm" and many alert contractors and designers have geared themselves for Turn-Key work.

- Medical Facilities, etc.:
Another area in which the Turn-Key method was greeted with wide acceptance has been in the construction of medical clinics, primarily for private practitioners. Doctors have enjoyed prosperity but their working hours prohibit their direct attention to building problems. As a result, the developer offering complete planning, building and financing has taken the burden from the doctor thus freeing him for the business and pleasure of direct interest to him. In this instance, the potentially higher cost factor does not seem to deter him from this method. The balance of income and income tax supersedes his caution in selecting the Turn-Key method.

- The Designers Role:
It is particularly notable in public works that governmental agencies such as City Councils, Boards of Education and others are completely disenchanted with the professional designers lack of ability to maintain a pre-established budget. Bids exceed estimates; errors in plans; failure to meet planning deadlines; improper or mismanaged bidding procedures; all add to the problems confronting the School Board in their approach to a building program. Once bond issues are successful, what School Board welcomes the necessity of going back to the electors for more money because the design professional "goofed"!

- Advantages and Disadvantages of the Turn-Key Method:
As in any facet of business, there are both advantages and disadvantages in the Turn-Key method of construction programming that must be carefully weighed before this method is selected by a public agency. The private Owner is accountable to no one but himself and his financial capacity. The public Board of Education is responsible to the people paying the bills, namely - the electors. With this thought clearly in mind, this elected body must weigh the facts and act accordingly. The following advantages include these arguments most commonly used by developers to sell the Turn-Key Methodology.

ADVANTAGES:

Guaranteed Cost........

School Board members, voters and taxpayers are disgusted with bids which exceed estimates; monumental type buildings; and general failure on the part of the design professional. As a result, a developer presenting a guaranteed cost with no allowance for error has an attractive package to buy. I.e. "We will give you so many square feet of school building to meet your need for X number of dollars - sit back and relax Board members".

Accelerated Rate of Construction.........

The developer selects the contractors (sometimes with the Owners consent and consultation) or, in many instances, acts as a building "broker", subletting the work in many small portions which, when assembled, becomes the total building. He advises the Owner that the construction time will be reduced because of the elimination of the time required for bidding, and better coordination of the work. The Owner may pay a premium to guarantee the completion of a building two months early, sometimes forgetting that the building will probably be used for the next seventy five years.

Selection of Contractors..........

The developer reserves the right to select the various contractors and there are decided advantages to this method, particularly in areas where competent builders are a rare commodity. Another advantage is that the contractor selected by the developer will no doubt give that developer his full cooperation or face the loss of future Turn-Key association.

Volume Buying..........

"We buy thousands of feet of chalkboard, thousands of dollars of hardware, thousands of board feet of lumber, etc.". Volume buying definitely leads to reduced costs per unit of material as most contractors and designers will readily ascertain. However, in many instances, the developer negotiates with the suppliers of those materials on a non-competitive basis and the supplier somehow manages to gain the order and more profit as a result. In the normal bidding process, many suppliers bid under competitive conditions and if they are not low, they lose the order and - the potential profit. Very seldom does the developer claim to purchase thousands of boilers, thousands of light fixtures, etc. because, although the mechanical and electrical part of the total contract amounts to approximately 40% of the total cost, the work is performed by mechanical contractors under more conventional conditions. Normally, it can be said that any contractor of substance engages in volume buying, therefore, this so called "advantage" must be carefully scrutinized.

Elimination of Bidding Costs..........

Normally the designer pays the cost of advertisements, plans and specifications and miscellaneous expenses related to the bidding process. This expense is a part of the standard design fee. The elimination of bidding may save approximately two weeks in the overall time that it takes to complete the project, however, it must be remembered that the developer must take the time to solicit private competitive bids on the materials and subcontract work.

Elimination of Change Orders..........

Once a budget has been determined and the bids are taken, there is seldom money left over for change orders in the conventional method. Change orders are a nuisance and have often caused strained relations between designer and Owner. There are two basic causes of change orders; the failure of the designer to provide an adequate set of plans, and changes which the Owner may request during the construction phase. The former cause due to incomplete plans should be the responsibility of the designer but often times, the Owner ends up paying. The second cause will be charged to the Owner in both the Turn-Key and competitive bidding process.

The answer may be to examine the designers past performance with regard to the number of change orders that he has caused in previous projects.

DISADVANTAGES:

Higher Profits for the Developer......

There is absolutely no question that the profit margin for the developer, designer and contractor will be higher under the Turn-Key method. The Owner has no way of determining this increase as it can be hidden in many different manners, none of which can be detected by the Owner. If there would not be a definite financial advantage via the Turn-Key method, there would be no valid reason to suggest this method to the Owner. If the profit margin is higher, the relative cost to the Owner for value received will also be higher.

Elimination of Competitive Bidding......

Our country has been established on the theory of free competition for progress and this is especially true for the construction industry. Many factors lead to low bidding, a few of which include the following:

- Efficiency of the individual contractor;
- Current work-load of the contractor;
- Ability of the contractor to obtain low sub-bids;
- Geographic location of the contractor as related to the site.
- Personal interest of the contractor in a particular project.

Competitive bidding will definitely yield lower prices to the Owner and it should not be unreasonable to suggest that if the Turn-Key method is selected - competitive bids between developers would be advantageous.

PROTECTION OF THE OWNER.......

In the bidding process, the competent designer acts as the agent for the Owner in such matters as project accounting, field inspections, material quality control, etc. He is completely independent of the contractors and therefore, is free to take any action deemed necessary for the complete protection of the Owner's interests. The Turn-Key operation does *not* afford the Owner with this protection, as there is no agent acting directly for the Owner. Even though the Owner may hire a local construction man as resident inspector, this has proven to be very ineffective in actually protecting the Owner from any wrong-doing with respect to the project.

The Owner can better protect his interests if he takes the time to investigate each designers past performance prior to the final selection. From that point on, the Owner will be assured of adequate protection.

THE EDUCATIONAL PROGRAM.......

Probably the most basic of issues involved in the Turn-Key process is that of determining the importance of the functional qualities of the proposal. After all, a school is designed to educate children -- not merely house them. Once a Turn-Key contract is signed, there is no assurance to the Owner that the building will be designed to meet the needs of the individual community.

It is absolutely impossible to prefabricate materials which will be adaptable to every educational program, and prefabrication will automatically lead to a stereotyped approach to planning.

BROKERAGE-TYPE CONSTRUCTION.....

The Turn-Key method in many instances becomes a matter of an individual firm acting as developer and broker in the construction process. Rather than utilizing the services of a competent general contractor skilled and capable of completing all phases of the general construction - the developer acts as a broker. Masonry work, concrete work, carpentry and other trades normally accomplished by one competent contractor is broken down into a number of small contractors, none of whom may be qualified in their specialty.

It must be remembered that once the Turn-Key contract is signed, the developer has full control. Any money that he can save by "skinning" prices becomes additional profit to him - not the owner.

INTERIM-FINANCING.......

If the contract with the Owner requires that the developer provide interim financing until completion of the project, he will without question pay a higher rate of interest than the Owner would. The cost of borrowed money will be included in the developers quotation which will obviously be reflected in a higher total cost to the Owner.

It is recommended that the Owner handle all financing to prevent double charges.

TAXPAYER REACTION.......

The conventional method of bidding has been long accepted by the public as the proper method to assure the lowest possible costs through sharp competition. The School Board may place themselves in an untenable position with the public if a Turn-Key developer is selected on a non-competitive basis. If criticism should develop because of this method, it could result in two drastic reactions; Loss of confidence in the Board of Education and - Loss of support for the bond issue.

In conclusion, suppose the non-competitive Turn-Key method is selected? How will the Owner with firm conviction be able to convince the public that the building would not have cost less through the competitive bidding process? The fact is clear that it will place the Board in a defensive position which may cause irreparable damage to the attitude of the community toward education and educational facilities.

The "Turn-Key" will place you, as Board Members, in this position whether the criticism is justified or not. Very seldom does the defensive team win the ball game.

Community Projects, Inc. is a Turn-Key oriented firm which offers complete planning, construction and financing services to our clients. It was primarily organized to compete for H.U.D. and private project work however, since some firms present this service to School Districts, we stand prepared to do the same. We are not in complete agreement that the School District will save time, money and problems, as is the main theme of the developers sales talk. If a guaranteed price is of prime importance to the Owner, we would welcome an opportunity to compete. However, we cannot, in clear conscience, promote the "Turn-Key" method to Public School Boards and officials as offering many advantages other than the guaranteed price.

We hope that this frank discussion will give cause to the reader to weigh all facts very carefully before committing public funds and tax dollars to a method which may not prove to be all that the promoter would have it be. Sometimes new ideas and methodology is accepted without challenge because the Owner does not want to appear out-moded. Careful investigation should not disturb anyone, leastwise the developer, if he is truly being honest with himself and the public.

- ELEMENTARY LEARNING CENTERS -

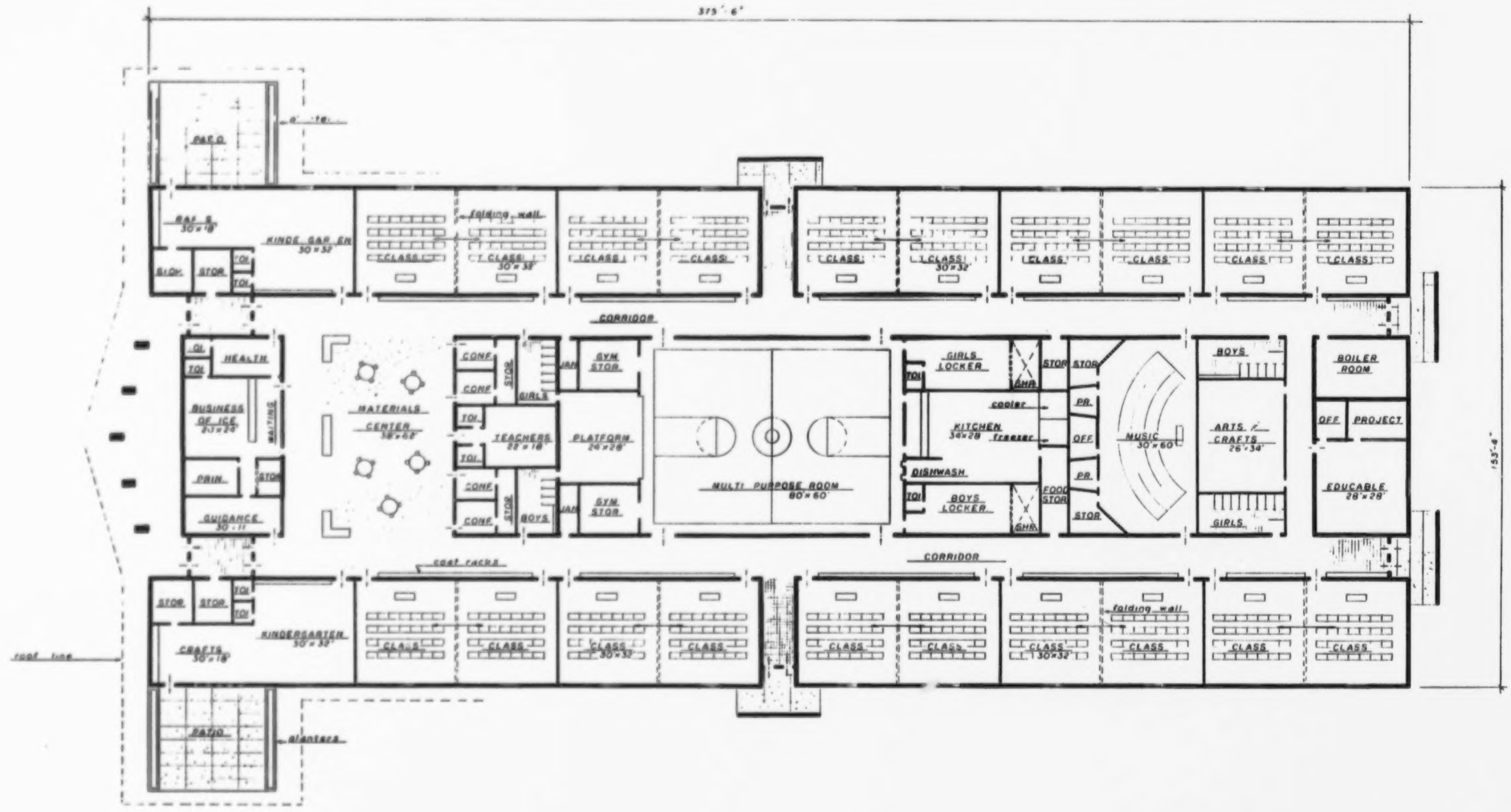
INTRODUCTION.......

In the section concerning elementary school facilities, the reader will find an assortment of hexagonal, rectilinear, circular and square shaped structures. These are representative samples of two story plans, single story plans, and combinations of the two.

> Not every district should build a circular or hexagonal school, nor should every building be designed in multi-levels. A district should not build something different for difference sake. A plan should evolve from the need, the program, the budget and - sound logic. Some structures afford more space then others at a lower cost. Some have functional advantages for a particular program. Others are more versatile and may be adapted to a number of program changes as education progresses.

It is the purpose of this section to present a representative sample of nearly every style of design to meet the demands of nearly every modern school program. It is not the purpose of this section to influence the reader or "sell" any given plan or building shape. No two districts have identical teachers, administrators, and children; and no two districts should have identical schools. The educational program is developed by the owner - the type of school should be determined by the owner and the community - not the designer.

> All school construction costs listed represent actual costs or estimates which have been projected to be valid until June, 1969.


375' 6"
153'-4"
PATIO
planters
roof line
KINDERGARTEN 30×32
CRAFTS 30×18
STOR
TOI
CLASS
CLASS 30×32
folding wall
CORRIDOR
coat racks
HEALTH
BUSINESS OFFICE 20×20
WAITING
PRIN
GUIDANCE
MATERIALS CENTER 38×62
CONF
TEACHERS 22×18
GIRLS
BOYS
GYM STOR
PLATFORM 24×28
MULTI PURPOSE ROOM 80×60
GIRLS LOCKER
BOYS LOCKER
SHR
KITCHEN 34×28
cooler
freezer
DISHWASH
FOOD STOR
PR
OFF
MUSIC 30×60
ARTS & CRAFTS 26×34
BOILER ROOM
PROJECT
EDUCABLE 28×28

ELEMENTARY LEARNING CENTER

SCALE 1/16" = 1'-0"

STUDY I

- BUILDING TYPE STUDIES -

RECTANGULAR PLAN (Semi-Compact) - 20 CLASSROOM UNIT - DESIGN CAPACITY 615

Total Building Area	64,000 sq. ft.
Building Area per Student	104 sq. ft.
Construction Cost per sq. ft.	$ 12.55
Construction Cost per Student	$ 1,242.00
Total Construction Cost	$764,205.18

- LIST OF FACILITIES -

- 20 Academic Team Teaching Classrooms @ 1000 sq. ft.	20,000 sq. ft.
- 2 Kindergarten Suites @ 1890 sq. ft.	3,780 sq. ft.
- Open Concept Materials Center Includes audio-visual training rooms, conference rooms, teachers preparation room, storage & toilet facilities.	4,100 sq. ft.
- Art Lab	820 sq. ft.
- Educable Suite Includes office and special projects room.	1,240 sq. ft.
- Combined Music Includes practice rooms, ensemble, office and storage rooms.	1,900 sq. ft.
- Multi-purpose Room	4,800 sq. ft.
- Related Facilities:	
Stage	520 sq. ft.
Boys Locker Room Includes shower, office & toilet.	860 sq. ft.
Girls Locker Room Includes shower, office & toilet.	860 sq. ft.
Gym storage	400 sq. ft.
- Food Center Includes dish washing area, dry food storage.	1,200 sq. ft.
- Administrative Center Includes business office, health room, guidance suite, principal's office, storage & toilet facilities.	2,020 sq. ft.
- Miscellaneous Facilities: Includes boys and girls toilets (dual facilities), janitors closets, mechanical rooms, corridors, lobbies, storage, individual conference rooms, etc.	
TOTAL USABLE AREA	64,000 sq. ft.

DESIGN COMMENTARY:

This single story, semi-compact rectangular plan has been developed to provide modern facilities for K-6 type enrollment programs. Although it does not include the non-graded, open concept, the classrooms have been oriented to provide multiplex of two units for team teaching. The folding walls are manually operated, which allows the teacher to open them in less time, but with more manual exertion than necessary with the electric units.

The classroom areas are spacious and allow adequate facilities for individual study and small group activities in the back of the classroom. With the inclusion of trapezoidal project tables, this extra area becomes a multi-use type facility directly within the classroom proper.

The kindergartens include 1890 square feet of usable floor area for each unit and they include a crafts alcove in each unit. We have purposely located them in the area adjacent to the offices and main entrances because the site will not allow access to the rear of the building. These children will attend school for one-half days and therefore, will be moving in and out at a more rapid rate than the full time attendance child.

Another feature of the kindergarten program is the outside play area and classroom designed for each unit. These outdoor classrooms have a complete roof shelter with a concrete patio and permanent benches to be used for class purposes. The school is located in a heavily wooded area and the teacher will be able to conduct nature tours in the area immediate to the school. After each tour, the class can return to the patio area for a discussion session of the observations made during the class tour. This facility will be available to other classrooms as well, and in the summer season it can serve as an outdoor shelter area for the summer playground director and the children.

If desired, the kindergarten class area can remain open during the summer session, thus providing an indoor activity zone during inclement weather and the toilet facilities may be used without disrupting the remainder of the building. This facility is a good example of a multi-use area that will serve a number of auxiliary functions as well as the primary purpose for which it was designed.

The materials resource center is slightly smaller than the similar facility shown on other plans, however, we have included 4100 sq. ft. which includes the audio-visual rooms and teachers work area. In our poll of the teachers in the school we have determined that they prefer that their facility be located immediately adjacent to the materials center. In many instances they must use the same reference material available to the children in their effort to program the curriculum and class presentations. If this material is not immediately available, it may be necessary to duplicate electronic equipment and reference rooms which is an expense that would be difficult to justify.

DESIGN COMMENTARY, Continued

As with a few of the previous designs, there are a number of short-comings including the absence of a separate cafeteria, and the omission of small group or quest areas. Also, we were not allowed to include a math-science quest area, although the inclusion of this type of facility is becoming increasingly important on the K-6 level.

There are several rather unusual features of the building which are worthy of mention, including the window and lighting design. The windows all include insulating glass typical of our designs, and these windows also include built-in venetian blinds, which are operated with a hand-held magnet pressed against the glass. The blinds are hermetically sealed within the glass and are not subjected to dust and normal wear, thus decreasing the maintenance costs. These windows are quite expensive, but they are extremely functional and trouble-free which is of prime importance.

The lighting system is completely indirect and there are no overhead type fixtures which cause shadow and glare problems. The fixtures are well mounted and completely shielded from direct exposure to the human eye which eliminates the "hot spots" normally found with the overhead lighting system. Although the cost factor is higher than with the high voltage system used in the circular designs; the cost factor compares favorably with other standard lighting systems. We believe the lighting will be more effective at substantially no increase in cost.

As is typical with all of our buildings, the roof has been designed with a natural pitch to the exterior and there are no troublesome gutters and downspouts. The surface is smooth and white in color, affording a high factor of reflectance. We do not favor tar and graveled roof surfaces for our climate and we are strongly opposed to flat roof buildings with interior drainage conduit.

This design must be considered as semi-compact as it is quite lengthy in proportion to the width. The reason for the building proportions came from a severe site limitation in which an $200.00 baseball diamond took precedence over a $900,000.00 educational facility. We have all experienced this type of problem once in awhile and we always ask ourselves why people can be so short-sighted at times.

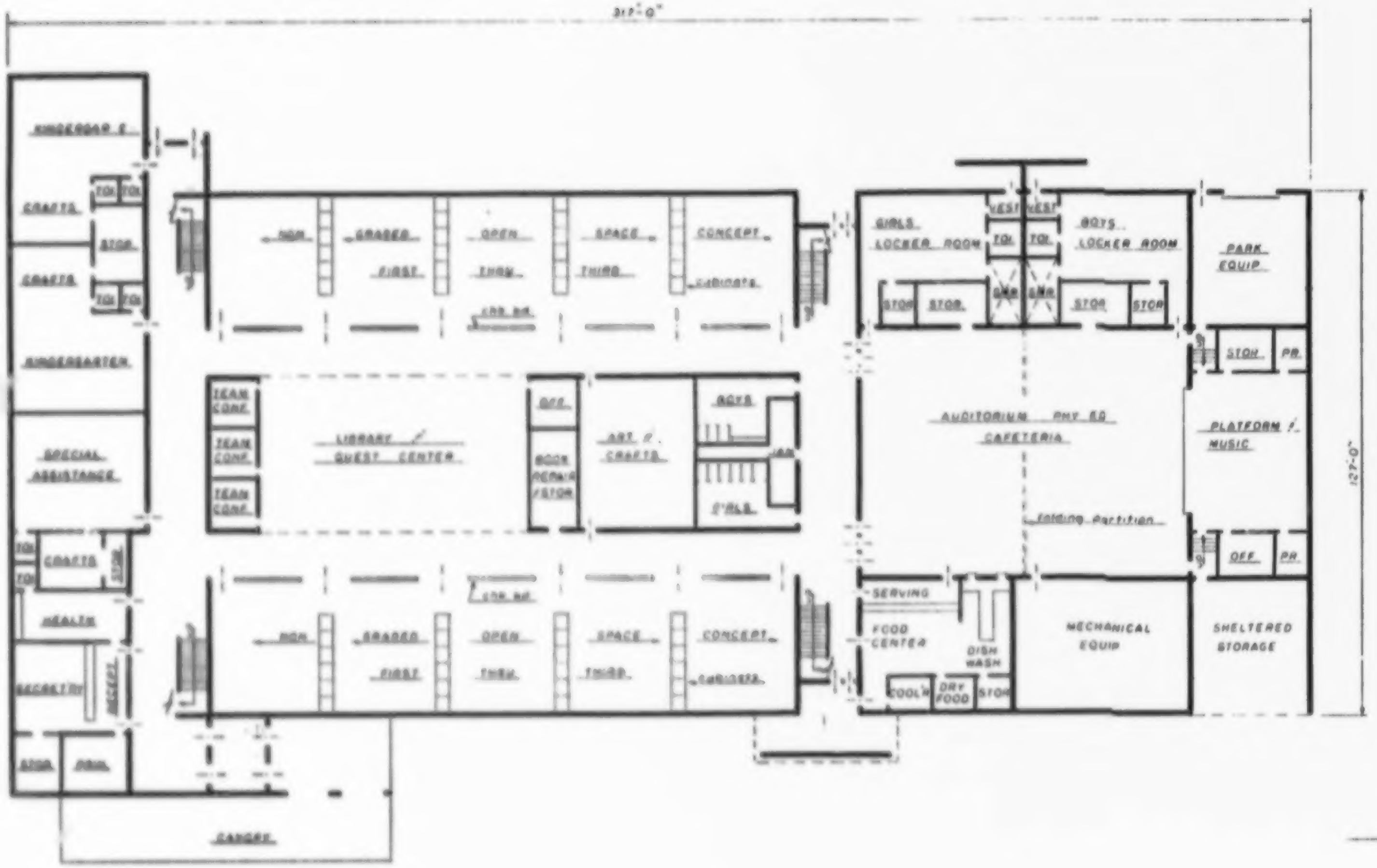
The district in which this school is located is ultra-conservative and although the P.T.A., teachers, and Board of Education very strongly favored the circular building --- we were instructed to design the rectangular plan as presented. Although the plan is functional and economical, it does offer many of the advantages of it's circular sister plan. The cost factor is considerably higher for the rectangle, yet we do not have the cafeteria, math lab, air-conditioning and other features found in the circular school.

DESIGN COMMENTARY, Continued-

The building has been designed with a modified team-teaching approach in mind and there was no attempt or intention to provide the open space concept. The academic classrooms are divided into pairs and these rooms are separated by manually operated folding walls. We have used both the manual and electric type and we have found the manual to be more efficient and faster to operate.

The use of exterior stone and brick compliment the flowing line of the roof which is supported by laminated beams which afford both warmth and beauty. The fact that these beams were manufactured within the district, increases the community pride concerning the building. The gymnasium has been recessed three feet into the ground to eliminate a break in the continuity of the roof line, thus eliminating troublesome and costly roof flashings.

One other feature of interest which, although not completely uncommon, is the temporary wall partition between the pairs of classrooms. To provide this flexibility, steel studs were used along with two separate layers of sheet rock on each side of the wall. The sheet rock was then covered with a layer of soft homosote and surfaced with washable vinyl. This construction provides a full wall tackboard surface from floor to ceiling with the surface completely washable. Other designers are using this method of partition construction and we will be seeing extensive use of this system in the future.


317'-0"
KINDERGARTEN
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TOI
STOR.
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KINDERGARTEN
SPECIAL ASSISTANCE
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STOR
HEALTH
SECRETARY
RECEPT.
STOR.
PRIN.
CANOPY
NON
GRADED
FIRST
OPEN
THRU
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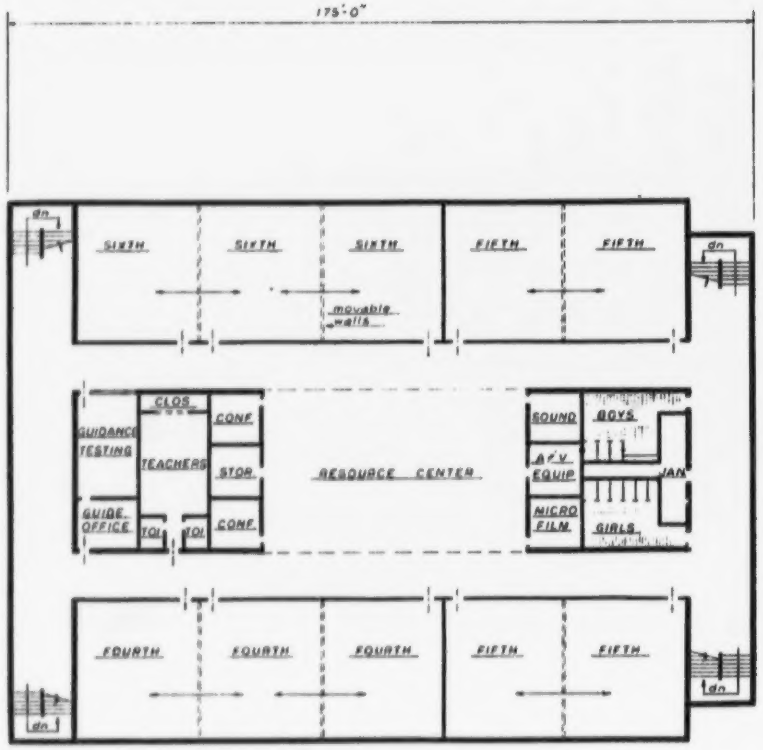
THIRD
CONCEPT
cabinets
chk. bd.
TEAM CONF.
TEAM CONF.
TEAM CONF.
LIBRARY / QUEST CENTER
OFF.
BOOK REPAIR / STOR
ART / CRAFTS
BOYS
JAN
GIRLS
chk. bd.
NON
GRADED
FIRST
OPEN
THRU
SPACE
THIRD
CONCEPT
cabinets
GIRLS LOCKER ROOM
VEST
VEST
TOI
TOI
SHR
SHR
STOR
STOR.
STOR
STOR
BOYS LOCKER ROOM
AUDITORIUM PHY ED
CAFETERIA
folding partition
SERVING
FOOD CENTER
DISH WASH
COOL'R
DRY FOOD
STOR
MECHANICAL EQUIP
PARK EQUIP
STOR
PR.
PLATFORM / MUSIC
OFF.
PR.
SHELTERED STORAGE
127'-0"


175'-0"
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SIXTH
SIXTH
SIXTH
movable walls
FIFTH
FIFTH
dn
GUIDANCE TESTING
CLOS.
TEACHERS
CONF.
STOR.
CONF.
GUIDE. OFFICE
TOI
TOI
RESOURCE CENTER
SOUND
A/V EQUIP
MICRO FILM
BOYS
JAN
GIRLS
FOURTH
FOURTH
FOURTH
FIFTH
FIFTH
dn
dn

SECOND FLOOR PLAN

FIRST FLOOR PLAN

SCALE 1/16" = 1'-0"

FIRST FLOOR	42,600 SQ. FT.
SECOND FLOOR	22,000 SQ. FT.
TOTAL AREA	64,600 SQ. FT.

STUDY II

- BUILDING TYPE STUDIES -

TWO-STORY	RECTANGULAR COMPACT	20 CLASSROOM UNIT	DESIGN CAP.615

Total Building Area	64,600 sq. ft.
Building Area per student	105 sq. ft.
Construction Cost per sq. ft. (Est.)	$ 15.00
Construction Cost per Student (Est.)	$ 1,570.00
Total Construction Cost (Est.).........	$965,000.00

- LIST OF FACILITIES -

FIRST FLOOR:

- 10 Academic Classrooms	928 sq. ft. ea.
- 2 Kindergarten Suites .... Includes Crafts Area, Storage and toilets.	1,280 sq. ft. ea.
- Special Assistance Suite .... Includes Crafts Area, Storage and toilet.	1,344 sq. ft.
- Library and Quest Center .... Includes three conference rooms, office and book repair.	2,926 sq. ft.
- Arts & Crafts	1,000 sq. ft.

SECOND FLOOR:

- 10 Academic Classrooms	928 sq. ft. ea.
- Resource Center .... Includes two conference rooms, sound room, audio-visual equipment, microfilm lab, storage facilities.	3,315 sq. ft.
- Teachers Room .... Includes closet, mens and womens toilets.	575 sq. ft.
- Office Suite	1,940 sq. ft.

Includes:
- Business office;
- Reception room;
- Health room;
- Principal's office;
- Guidance testing;
- Guidance office;
- Storage;
- Toilet facilities.

DESIGN COMMENTARY:

The combination of open concept, non-graded and team teaching rooms is expressed in detail in this plan with complete flexibility, as the design objective. The lower grades are housed in open concept, non-graded areas, which are completely wall-less in nature. The cabinetry is used as a vision screen, and carpeting, together with acoustical tile will yield a sound separation. This plan broadens the open concept presented earlier in the circular plan.

> The two-story plan does not allow as much flexibility in traffic flow and we have the problem of providing duct space for the heating and plumbing systems. Intersecting corridors and stairways also tend to restrict the flow of traffic. We also encounter a problem in the structural system because in the single story open plan we are designing for a roof load of 30# per sq. ft., whereas the two-story plan requires a design load of approximately 60 to 80# per sq. ft. As a result, our spans will, by necessity, become shorter in length or, the structural system will become more expensive for the additional load factor. These points are important as many people believe that the two-story building is more economical, but this does not prove to be true in the open concept plan.

The Kindergarten, Special Assistance and lower grade classrooms have been located at ground level, whereas the team-teaching upper grade classrooms have been assigned to the upper level. The gymnasium, locker and shower rooms, food service area and mechanical equipment rooms are in a single story configuration to the rear of the two-story section. In this manner the service areas are immediately accessible to the exterior of the building at grade level.

> The classrooms are spacious and provide approximately 1000 sq. ft. of teaching space in each unit. There is an ample number of conference rooms available and the materials resource centers are strategically located. Because of the prime importance of these facilities, it was decided to provide two units rather than a single facility at one level. This unit has been designed to double-deck in a mezzanine type arrangement which is gaining increased popularity.

Although adequate team preparation rooms have been included we do have an absence of quest areas which could have enhanced the operation of the team teaching area. This was not practical in the two-story building primarily because of the symmetry of classrooms top and bottom. We can use the materials center as a substitute for some of the quest and small group activities, but this will not provide the full effect.

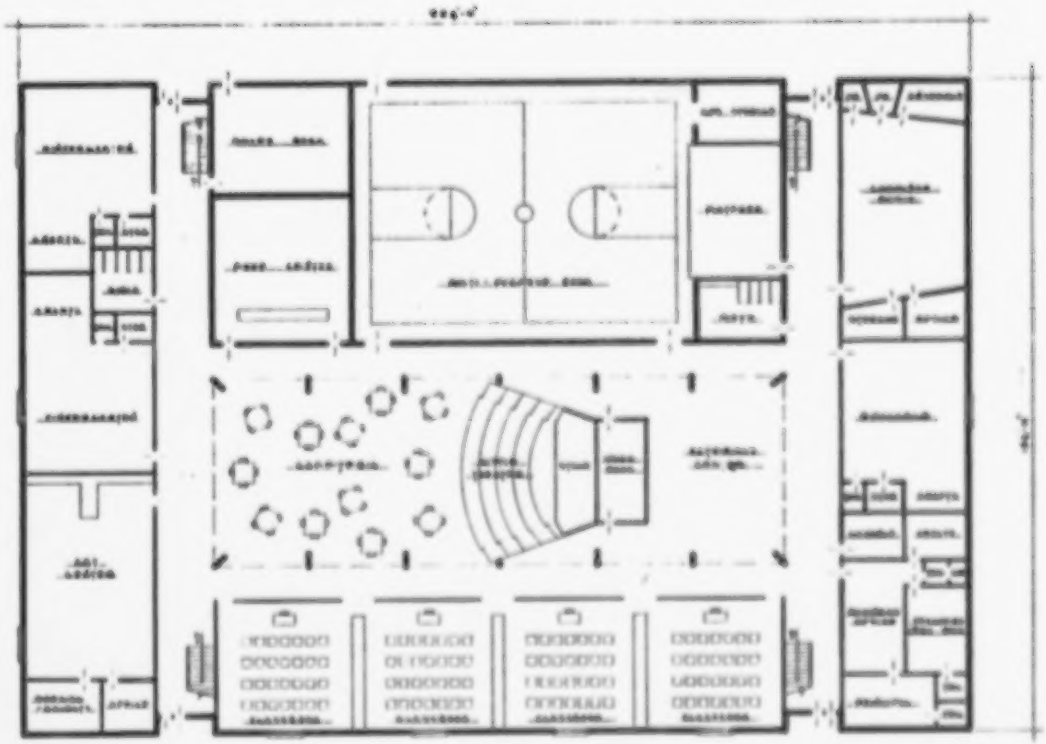
DESIGN COMMENTARY - Continued

In the two-story plan, we have provided approximately 1050 sq. ft. of floor area per student, but the effect of this spacious allocation does not represent a true picture. We have devoted more space to corridors, stairways and duplicated facilities because of the two-story configuration, and for all practical purposes --- we probably have less than 1000 sq. ft. available to the student.

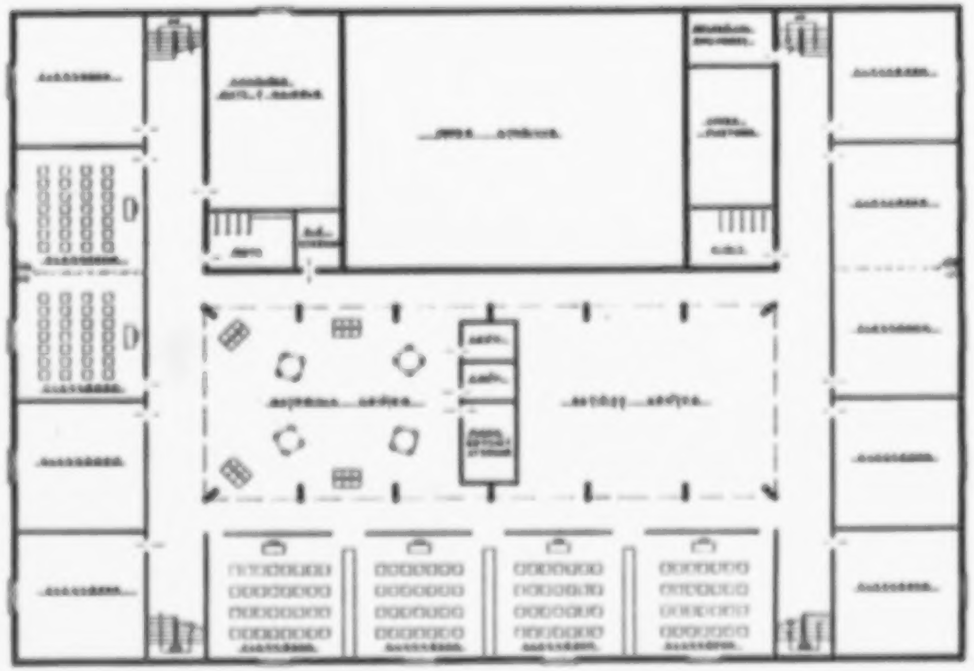
Although this plan is completely modern in concept as compared to many elementary schools being built today, it is highly questionable as to the effectiveness of the flexibility as compared to the circular or hexagonal open plans. This probably explains in part, the reason for the great number of single story K-6 schools as opposed to those designed in a bi-level configuration.

As the building is designed for greater flexibility, the equipment designs have also undergone a drastic change. No longer do we provide counter-top units rigidly affixed to the walls of the structure. Every piece of equipment is designed to be completely mobile and most items are provided with casters to facilitate any movement. The chalkboards and tackboards are mounted on flexible aluminum tracks which will allow complete removal and interchangeability in the future with maximum ease. The chalkboard applied to the wall with a permanent adhesive is rapidly being discarded as being a barrier to true flexibility.

It is quite foolish to provide a flexible structure and then equip it with inflexible units which cannot be moved without a maximum of labor and expense. It is equally unwise to program a design philosophy with no regard for the coordination of those items to be purchased directly by the owner. Some designers include the equipment in their contract --- others do not. One fact is certain, in either case, the work must be coordinated with the basic functional design.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

TOTAL AREA 69000 sq ft

ELEMENTARY LEARNING CENTER

STUDY III

- BUILDING TYPE STUDIES -

TWO-STORY COMPACT 18 CLASSROOM UNIT DESIGN CAPACITY 565

Total Building Area	69,000 sq.ft.
Building Area per student	122 sq.ft.
Construction Cost per sq. ft.	$ 13.90
Construction Cost per student	$ 1,700.00
Total Construction Cost	$960,000.00

- LIST OF FACILITIES -

- 18 Academic Classrooms	960 sq. ft. ea.
- 2 Kindergarten Suites Includes crafts area, storage and toilet facilities.	1,380 sq. ft. ea.
- Art Center Includes office and special projects room.	1,800 sq. ft.
- Educable Suite Includes crafts area, storage and toilet.	1,200 sq. ft.
- Math and Science Lab	1,470 sq. ft.
- Combined Music Includes practice rooms, ensemble, office and storage.	1,800 sq. ft.
- Multi-purpose Room	4,800 sq. ft.
- Related Facilities:	
Platform	704 sq. ft.
Gym Storage	280 sq. ft.
- Food Center	1,080 sq. ft.
- Cafeteria	2,640 sq. ft.
- 2 Open Materials Centers	4,230 sq. ft. ea.
- Open Theater and Stage	1,024 sq. ft.
- Activity Center	2,640 sq. ft.
- Office Facilities Includes business office, health room, guidance room, principal's office, teachers work room and toilet facilities.	1,500 sq. ft.
- Miscellaneous Facilities: Includes mechanical rooms, boys and girls toilets, lobbies, corridors, conference rooms, storage, etc.	
TOTAL USABLE AREA	69,000 sq. ft.

DESIGN COMMENTARY:

This two story compact plan combines simplicity and spaciousness to provide an educational facility of relative low cost and spacious environment. Although many educators do not prefer two story construction for the lower (K-6) elementary grades, there are never-the-less a number of these units in larger metropolitan areas where land acquisition represents a major expenditure. There are certain features that increase the cost yet reduce the total usable space available to the child and teacher for academic purposes. These features include more corridor space and stairways that prove to be costly.

We must recognize the fact that the two story plan will not allow the unrestricted flow of students for the same reasons. Intersecting corridors and stairways do slow traffic and they cause congestion problems not as prevalent in the single story plan. Maintenance problems are slightly greater as far as cleaning is concerned, but heating costs are normally decreased. The two story plan has less roof area, but the roof construction is normally flat with interior drains which can present severe maintenance costs over a long period of operation.

Again, we have combined the open space, non-graded concept with team teaching classrooms in the upper grades. In all areas, walls can be added to the open areas and a modified "cell"type facility may be obtained. In the team areas we have not included guest areas and team rooms as this plan provides a very large resource center for individual and small group type activities. Large group activities may be implemented in the little theatre or in any of the expandable class areas.

As with most of our current plans, the central core has become the focal point of the building with the presence of the commons-cafeteria, little theatre, materials resource centers and activity center. The design has provided maximum access to these areas and the program is enhanced by the availability of free, unobstructed space. If desired, many of the open areas may be sub-divided through the use of free-standing acoustical panels which have become increasingly popular in other parts of the country. These units are completely versatile and represent the most economical and functional method of providing sound and sight separations. In many instances, this separation can also be achieved with the extensive use of moveable classroom cabinets.

Once again, we have provided separate facilities for the cafeteria, math-science laboratory, art laboratory and related facilities. Combined facilities have some advantage when economics must be considered to be of prime importance, however, with judicious planning, we prefer to design a facility for one given function. We have determined that in many instances, multi-use facilities do not function properly in any of the assigned functions for which they were supposedly designed. We can be easily misled into the mistaken idea that one area can serve many purposes particularly if the usage involves the time required for the set-up and/or removal of special seating, music stands, tables, etc. Therefore, it behooves the Owner to consider these matters carefully rather than to take the word of the designer who may not understand the function.

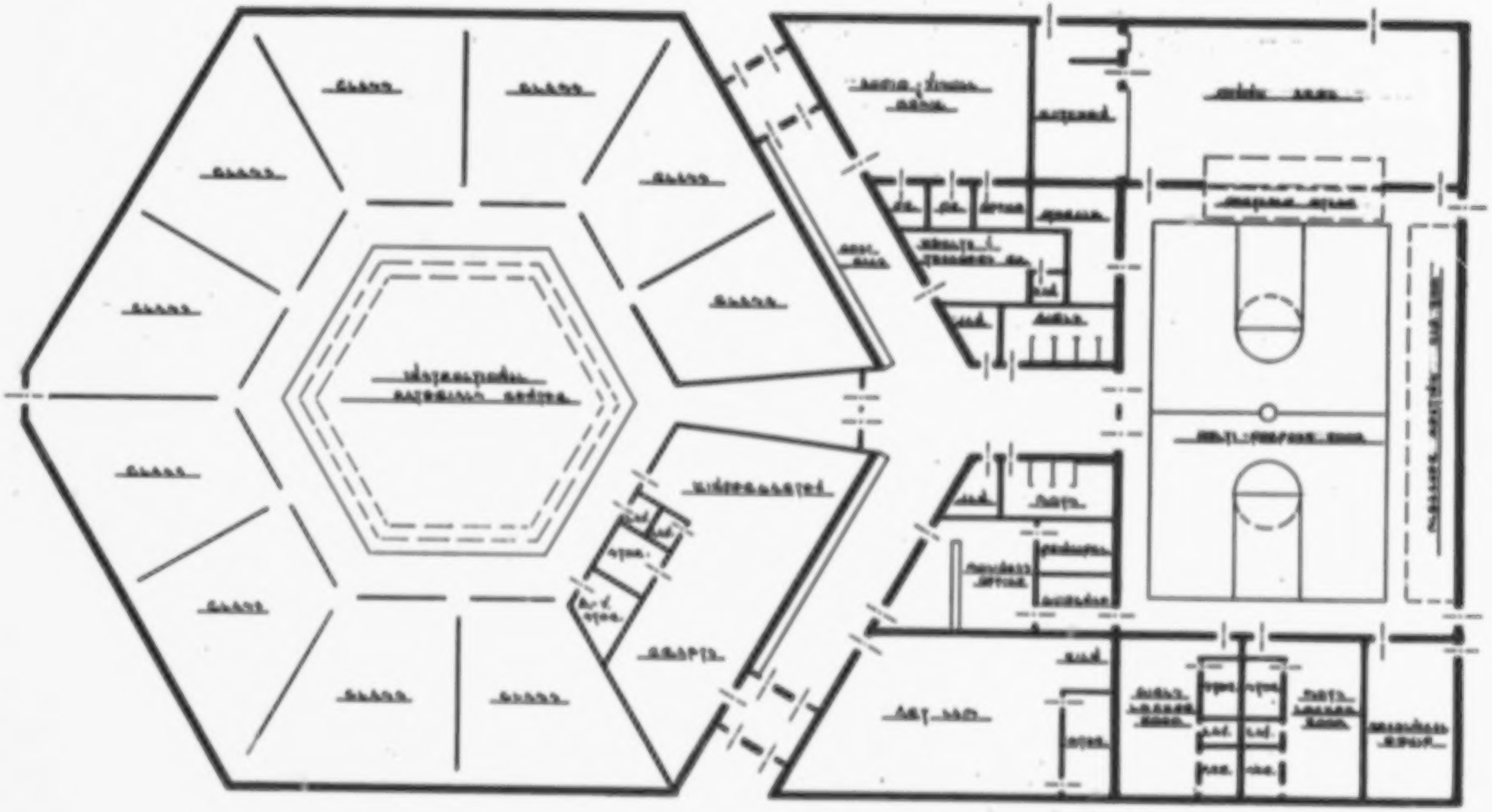
DESIGN COMMENTARY: (Cont.)

This school may also serve as a neighborhood center because of the library, physical education, art, music and playground facilities. This would indicate the probability of continued use throughout the year. With this in mind, we recommend that the heating system be designed to include immediate and complete air conditioning or, at least, provision for future installation. This would virtually eliminate the use of the unit ventilator type system.

If the Owner desires to incorporate quest areas and team work rooms rather than use the open areas as planned, this revision would require little additional expense and would be well worth the investment if they fulfill the intended purpose.

Although the plan itself is quite straight forward and would indicate that the building will be plain in appearance, aesthetic features can be added to the exterior in the form of canopies, outdoor study areas and decorative feature panels. These features can be included because of the low building cost as dictated by the simplicity of the design. Possibilities of future expansion are excellent due to the nature of the design, and the central core facilities will effectively support additional classrooms without strain.

One other factor which should be of strong interest in the design is the compatability factor with the surrounding terrain. The wall loading will be substantially greater in the two story design as opposed to the single story structure. As a result, increased bearing values of the sub-soil will be necessary to adequately carry these loads. If the surrounding buildings are primarily residential, thought should be given to the design of the building to provide an aesthetic appeal compatable to the residential neighborhood.


CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
KINDERGARTEN
CRAFTS
ART LAB
MULTI-PURPOSE ROOM

TOTAL AREA 33,500 SQ.FT.

ELEMENTARY LEARNING CENTER

SCALE 1/16" = 1'-0"

STUDY IV

- BUILDING TYPE STUDIES -

HEXAGONAL COMPACT 10 CLASSROOM UNIT DESIGN CAPACITY 300

Total Building Area	33,500 sq. ft.
Building Area per student	112 sq. ft.
Construction Cost per sq. ft.	$ 14.10
Construction Cost per student	$ 1,575.00
Total Construction Cost	$473,000.00

- LIST OF FACILITIES -

- 10 Academic Classrooms	1,020 sq. ft. ea.
- Kindergarten Suite Includes dual toilets, crafts area, class area and storage.	1,836 sq. ft.
- Instructional Materials Center	2,680 sq. ft.
- Music Suite Includes dual practice rooms, and office.	1,496 sq. ft.
- Art & Crafts Lab Includes office, storage.	1,700 sq. ft.
- Office Suite Includes Business office, Principal's office and storage.	640 sq. ft.
- Teachers Room - Health Room Includes lavatory and nurses office.	640 sq. ft.
- Cafeteria Includes kitchen and seating for 100 students.	2,720 sq. ft.
- Multi-purpose Activity Area	5,184 sq. ft.
- Boys Locker Room Includes shower & lavatory.	740 sq. ft.
- Girls Locker Room Includes shower & lavatory.	740 sq. ft.
- Miscellaneous Facilities: Includes dual janitors closets, miscellaneous storage, corridors, mechanical equipment area.	
TOTAL USABLE AREA	33,500 sq. ft.

DESIGN COMMENTARY:

The plan as presented, represents both strength and weakness which is caused by the effort to combine a hexagonal and rectilinear unit in a very restricted area. The total area of 33,500 sq. ft. does not allow an economical union of two hexagonal units, which would have been an ideal solution for this ten classroom facility. The strength becomes apparent in the academic wing, whereas the weakness becomes equally obvious in the rectilinear unit.

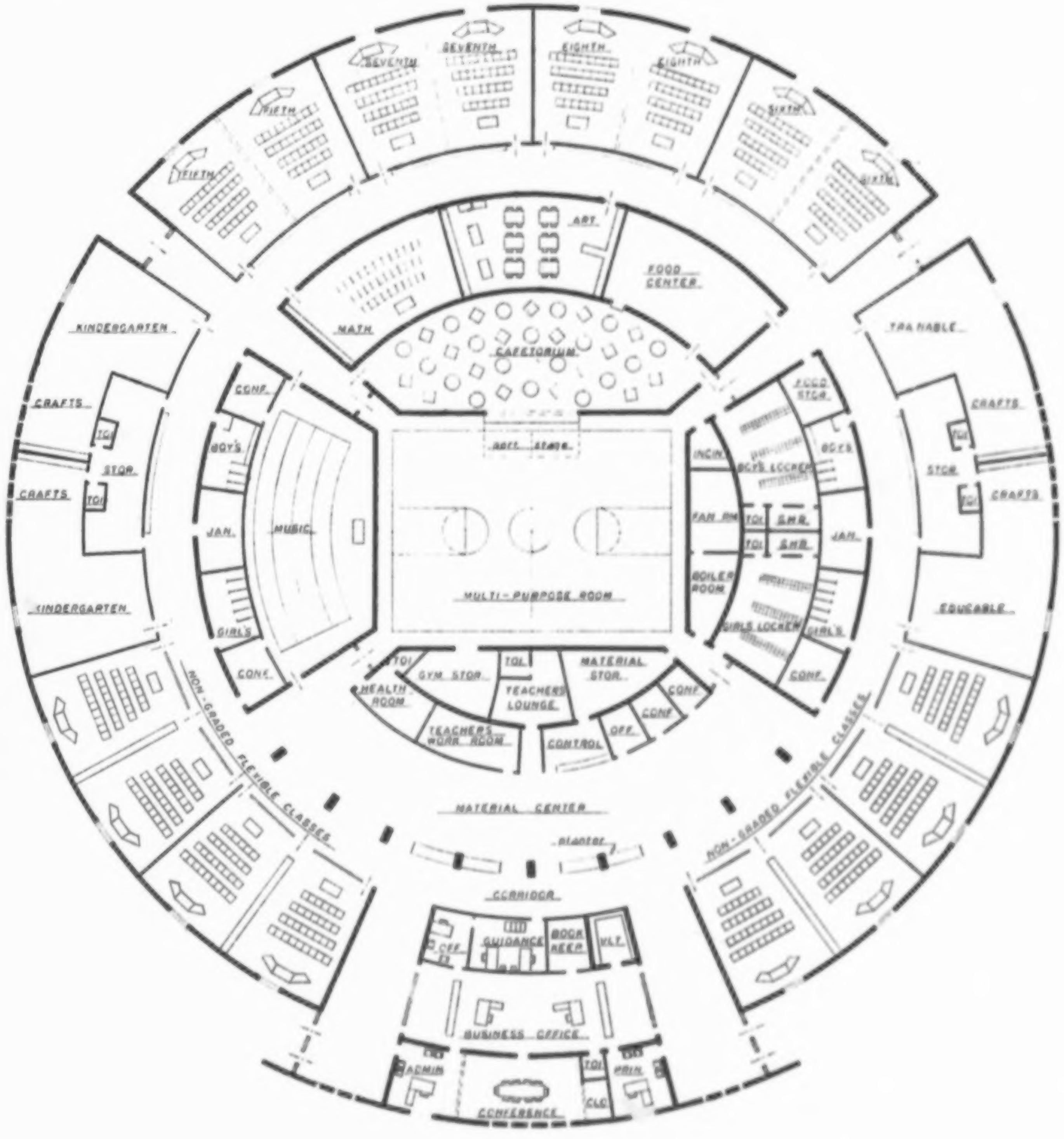
The focal point of the academic wing is the spacious materials resource center which serves as the apex for the ten academic classrooms and the kindergarten areas. The entire area within the hexagonal perimeter is designed with carpeted floors to provide additional sound control and lower maintenance. Several risers separate the class areas from the instructional materials center, and this change in floor level provides a natural theater in the round.

Although the carpeted risers represent an asset, because of the large group seating capabilities, and also because of the psychological advantage of the sight-level separation, it does have one definite draw-back. If most of the audio-visual equipment is located in the instructional materials center at the lower level, it does restrict the movement of the equipment into the individual class areas. It then becomes a question of which function assumes the greater importance in the total design. The idea of the separation of sight-level and noise plane cannot be ignored in the open concept, as well as the pleasant effect on the children and teachers.

The reduction in the amount of corridor area in this plan, as compared to the traditional rectilinear facility, is apparent and more usable space is the ultimate reward. However, in the total view, this plan could have been more economical in a compact circle or possibly, even the rectangle. In the latter case, it would be impossible to maintain the symetry about the instructional materials center.

Many times the question arises concerning the location of interior academic classrooms that do not have windows. Within the near future, we will no longer require the present 40 sq. ft. of windows per classroom, as the Wisconsin Building Code is about to change with dramatic design results possible. In this plan, we must provide a total window area of 40 sq. ft. per class area, but this glass area does not have to be located in each individual class space. The window areas in this plan would total approximately 40 x 10 = 400 sq. ft., and the glass would be located along the three exterior walls available.

Although ultimate flexibility becomes possible in the academic area, and the sound separation between the quiet zone and activity areas is almost ideal; the noise areas are not very flexible. There are several features such as the separate cafeteria and individual art and music areas; but the overall plan does not have the feeling of functional economy found in many of the other design studies presented herein.


SEVENTH
SEVENTH
EIGHTH
EIGHTH
FIFTH
FIFTH
SIXTH
SIXTH
MATH
ART
FOOD CENTER
CAFETORIUM
APRT. STAGE
KINDERGARTEN
CRAFTS
TOI
STOR
CRAFTS
TOI
KINDERGARTEN
TRAINABLE
CRAFTS
TOI
STOR
TOI
CRAFTS
EDUCABLE
CONF.
BOY'S
JAN.
MUSIC
GIRL'S
CONF.
MULTI-PURPOSE ROOM
FOOD STOR.
INCIN
BOYS LOCKER
BOY'S
FAN RM
TOI
SHR.
TOI
SHR.
JAN.
BOILER ROOM
GIRLS LOCKER
GIRL'S
CONF.
TOI
HEALTH ROOM
GYM STOR
TOI
TEACHERS LOUNGE
MATERIAL STOR.
CONF.
CONF.
OFF.
TEACHERS WORK ROOM
CONTROL
NON-GRADED FLEXIBLE CLASSES
NON-GRADED FLEXIBLE CLASSES
MATERIAL CENTER
planter
CORRIDOR
OFF.
GUIDANCE
BOOK KEEP
VLT.
BUSINESS OFFICE
ADMIN
TOI
PRIN.
CONFERENCE
CLO

ELEMENTARY LEARNING CENTER.

SCALE 1/16" = 1'-0"

TOTAL AREA 60,000 SQ.FT.

STUDY V

- BUILDING TYPE STUDIES -

CIRCULAR - COMPACT   16 CLASSROOM UNITS   DESIGN CAPACITY 510

Total Building Area	61,100 sq. ft.
Building Area per student	1,200 sq. ft.
Construction Cost per sq. ft.	$ 10.32
Construction Cost per student	$ 1,265.00
Completed Cost per sq. ft. (Including carpeting and all furniture, fees and landscaping, etc.)	$ 13.10

- LIST OF FACILITIES -

- 8 Team Teaching Classrooms	900 sq. ft. ea.
- 8 Open Concept Classrooms	890 sq. ft. ea.
- 2 Kindergarten Suites Includes Crafts Area, Toilet and Storage.	1,840 sq. ft. ea.
- Educable Suite Includes Crafts Area, Toilet and storage.	1,840 sq. ft.
- Trainable Suite Includes Crafts Area, Toilet and storage.	1,840 sq. ft.
- Elementary Math	900 sq. ft.
- Elementary Art	900 sq. ft.
- Elementary Music Includes Practice Rooms.	2,000 sq. ft.
- Multi-Purpose Room	4,800 sq. ft.
- Food Service Center	1,020 sq. ft.
- Cafeteria	2,150 sq. ft.
- Boys Locker Room Includes Shower and Toilet.	1,000 sq. ft.
- Girls Locker Room Includes Shower and Toilet.	1,000 sq. ft.
- Open Concept Materials Center Includes office, audio-visual reference room, teachers workroom and storage.	4,600 sq. ft.
- Health Room Includes Toilet.	500 sq. ft.
- Administrative Center Includes business office, guidance room, vault, bookkeeping room, private office, administrators office, conference room and principals office.	3,500 sq. ft.
- Miscellaneous Facilities Includes toilets, closets, corridors, lobbies, storage, etc.	16,950 sq. ft.

DESIGN COMMENTARY -

The fact that the building provides a useful area of 1,200 sq. ft. per pupil gives some indication of the spaciousness of the facilities. The classrooms are designed for two functions --- the open classrooms provide flexible room conditions for the lower grades on the non-graded program. The enclosed classrooms are divided in groups of two with an electrically operated folding wall which can be opened with the turn of a key to allow large group lectures.

In the open classrooms, carpeting has been provided for acoustical control and the sight separation has been accomplished with the multi-use moveable class cabinets which can be easily moved or removed if desired. The lighting and heating systems have been designed to allow complete flexibility. The chalkboards, tackboards, shelving and apparatus has been designed for complete movement and interchangeability as allowed by the Korok mobile track system. Classroom sink units have been provided for grades 1 thru 4 and these units are complete with drinking fountain facilities.

The team-teaching rooms also feature the Korok moveable track system which allow height adjustment and inter-changeability of the tackboards and chalkboards. The moveable walls are electrically operated as manufactured by the Brunswick Corporation and these walls are 9'-0" in height and 34'-0" long. The time required for opening or closing, as separate operations, is approximately one minute. In the open position, two classes are combined for audio-visual presentations and the team approach.

The focal point of the entire school facility and the educational program is represented by a spacious materials resource center encompassing an area of approximately 4,600 sq. ft. Carpeted floors are featured throughout this entire area. The teachers workroom, teachers lounge and conference rooms are directly adjacent to this facility, which represents an ideal solution concerning control and unlimited use of the materials by both student and teacher. The equipment has been specially designed by the Brunswick Corporation and the most modern methods of complimenting individual and small group study, are evident to the visitor. The prefinished paneled walls compliment the carpeting to provide the warmth and comfort recommended for the learning environment.

The multi-purpose room and cafetorium are immediately adjacent to each other and an opening has been included to facilitate the location of the portable stage to serve both areas. The opening is closed when the stage is dismantled, by a heavy duty moving wall to assure full flexibility. The provision of a separate cafeteria has allowed the use of an attractive and functional wood gym floor not common to most elementary school facilities. The gymnasium is 60' x 80' which will allow division into two 40' x 60' playing courts in the future. The cafetorium has a capacity of approximately 250 students and a complete food preparation center has been included with a serving capacity in excess of 600 meals. The kitchen includes the most modern equipment, such as the steam kettle and convection ovens. The cost of this equipment is included in the total project cost and the sanitary requirements have been maintained with the use of quarry tile flooring and liquid tile walls.

DESIGN COMMENTARY, Continued -

Spacious kindergarten facilities are of interest to the visitor, as they are completely functional and provide the room required by active youngsters experiencing their first visit to school life. The total area provided is approximately 1,840 sq. ft. including the separate crafts area, dual toilet facilities, spacious storage areas and the standard size classroom. Recognizing the free movement of these youngsters, the main classroom area is completely carpeted whereas hard tile has been used in the crafts area where the paste, paint and other messy materials are used with reckless abandon by the five and six year olds. A visit with the teachers indicates the true value of adequate space and environmental conditions for these uncertain and wary children.

The Educable and Trainable suites have been designed with similar facilities and finishes as the kindergartens. The space allocations are identical and the crafts provide adequate facilities for sewing, cooking, woodworking and other light manual crafts projects. These children have been recognized as being of equal importance in the school system and fortunately, they have not been isolated in confined areas as is so common in many school facilities. We recognize the fact that no group of children sincerely appreciate the learning process and the thrill of accomplishment more than these youngsters.

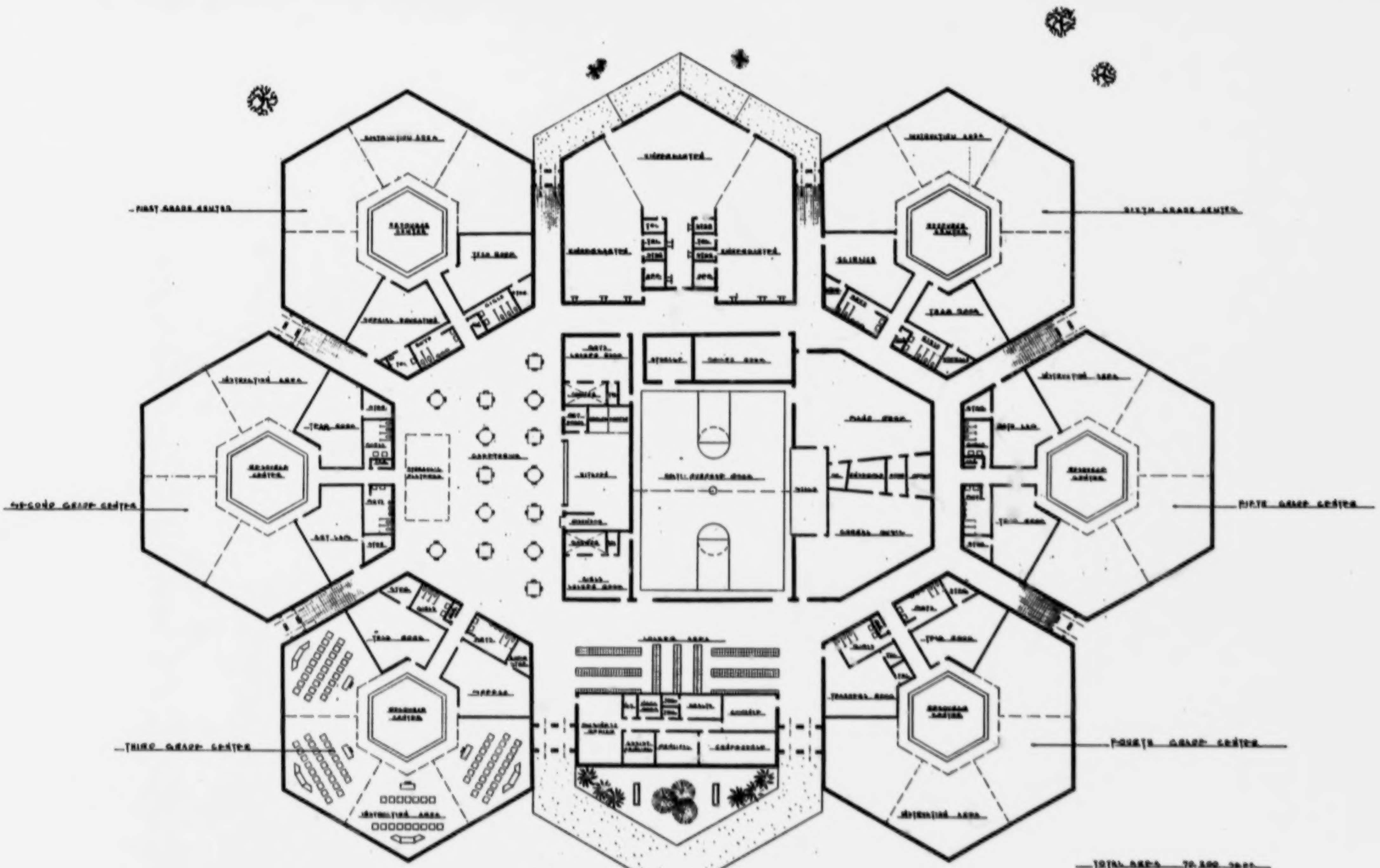
Complimenting the academic facilities is a large office complex featuring spacious accommodations accented with paneling and bright pastel colors. The office suite includes a Board Room, Administrative Office, Principal's Office, Guidance Suite, Vault, Bookkeepers Office and Toilet Facilities. In the administrative area, the paneled walls are complimented by colored decorative glass block panel with carpeted floors.

The departments include separate laboratory rooms for mathematic and art with the latest Brunswick equipment available to the student and teacher. Special mathematics tables for the students and special chalkboard units presenting graphic and grid coordinates have been included along with special electronic teaching aids. The art laboratory is equipped similarly with art-oriented cabinetry, chalk and tackboards, and student work units. The lighting has been increased for close work and the recessed fixtures provide high intensity lighting with a minimum of glare.

The music department is much more spacious than normal for an elementary unit and this facility will serve a dual function. It will be used for music and large group lectures particularly with audio-visual equipment as teaching aids. The walls are paneled with acoustical material to provide sound absorption and these panels also lend vitality to the appearance thru the use of contrasting pastel colors. The practice and ensemble rooms are immediately adjacent to the main music lab and are not uncommon in design.

DESIGN COMMENTARY, Continued-

The building is not common in shape or function and many educators who have toured the building have been very complimentary. The facility is not perfect and we recognize that improvements are always possible and there are minor alterations that could be made to improve our building. However, we are proud of the environmental surroundings offered to our children and we have little doubt that the special features in this school will enhance the learning process of the child. The fact that this building cost less than $10.50 per square foot, including a full air conditioning system, has caused widespread interest.


FIRST GRADE CENTER
SECOND GRADE CENTER
THIRD GRADE CENTER
FOURTH GRADE CENTER
FIFTH GRADE CENTER
SIXTH GRADE CENTER
KINDERGARTEN
RESOURCE CENTER
INSTRUCTION AREA
TEAM ROOM
SPECIAL EDUCATION
ART LAB.
MATH LAB.
SCIENCE
STOR.
CAFETERIA
STAGE
MULTI-PURPOSE ROOM
STORAGE
LOCKER AREA

TOTAL AREA 70,200 SQ.FT.

ELEMENTARY LEARNING CENTER OPEN CONCEPT
SCALE 1/16" = 1'-0"

2

STUDY VI

- BUILDING TYPE STUDIES -

HEXAGONAL PLAN - COMPACT CLUSTER 24 CLASSROOM UNIT DESIGN CAPACITY 750

Total Building Area	70,000 Sq. Ft.
Building Area per Student	95 Sq. Ft.
Construction Cost per Sq.Ft. (Estimated)	15.70
Construction Cost per Student	$ 1,470.00
Total Construction Cost	$1,100,000.00

- LIST OF FACILITIES -

- 24 Academic Class Areas	920 Sq. Ft. Ea.
- 6 Materials Resource Centers (W/Combined Lecture)	1360 Sq. Ft.
- 3 Kindergarten Suites Includes 3 Toilets, Dual Offices, 3 Storage Rooms	1600 Sq. Ft.
- 1 Special Education Classroom	720 Sq. Ft.
- 1 Art Room	820 Sq. Ft.
- 1 Speech Correction Lab	820 Sq. Ft.
- 1 Mathematics Lab	820 Sq. Ft.
- 1 Science Lab	840 Sq. Ft.
- 6 Team Work Rooms	800 Sq. Ft. Ea.
- 1 Instrumental Music Room Includes Practice, Ensemble, Storage, Office	1600 Sq. Ft.
- 1 Choral Music Room	1000 Sq. Ft.
- 1 Multi-purpose Room	4800 Sq. Ft.
- 1 Boys Locker Room Includes Shower & Toilets	570 Sq. Ft.
- 1 Girls Locker Room Includes Shower & Toilets	570 Sq. Ft.
- Food Service Center	1000 Sq. Ft.
- Office Suite Includes Business Office, Vault, Workroom, Dual Toilets, Health Guidance, Conference, Principal Office, Ass't. Principal's Office	962 Sq. Ft.
- Cafetorium (Multi-use with Hydraulic Storage)	5200 Sq. Ft.
- Miscellaneous Facilities: Includes Dual Storage & Toilet Rooms for each Pod, Mechanical Equipment Room, Janitors Closets, Miscellaneous Storage	

DESIGN COMMENTARY -

The hexagonal plan as presented, represents the most severe departure from the traditional building design and again, this deviation from the normal has been caused primarily due to the need for greater flexibility. This plan not only provides the flexibility, but it offers one other decided advantage --- we have succeeded in isolating each grade level within a separate independent house or 'pod'.

The focal point of each house or pod is the center portion, which is devoted to a large materials center and miniature theatre in the round. Walls have been eliminated and each hexagon will be completely carpeted, including the risers or seats leading down into the materials resource center. This center can be used as an open area to facilitate large group instruction, and the seating in each center is more than adequate to accommodate all of the children within that house. If the teachers, working as a team, decide to use it as a reference and individual study area, the center is large enough to serve in both capacities.

Each house has individual toilet facilities as well as storage areas and team rooms. Although there are no quest centers defined as such, the area of each hexagon is of adequate size to facilitate the addition of quest areas within the house. The teachers have the added advantage in the opportunity to allow students to use the resource center without total supervision as each teacher can observe the activities within the central core.

The Kindergarten Suite presents another example of complete flexibility as compared to the previous plans under consideration. Through the use of folding walls, the suite of three separate kindergartens can be transformed into one large group activity area at the touch of a button. Any two units can be combined, or the extra suite can be opened. Conversely, if the program dictates privacy, all doors can remain closed and the three suites can be maintained as individual units.

The very large, multi-use cafeteria area also has every opportunity of affording a greater variety of functions under the hexagonal plan. For example, if the hydraulic stage is in the elevated position, the entire cafeteria may become a spacious and comfortable auditorium with a seating capacity of at least five hundred adults and over 600 children. The children can be seated directly upon the carpeted floor if the teachers so desire, or, for smaller groups, the cafeteria chairs or benches can be utilized to good advantage.

Another decided advantage of the hexagonic cluster is the virtual elimination of costly corridors. There is a minimum amount of traffic flow because except for music and physical education, each house is nearly self-sufficient.

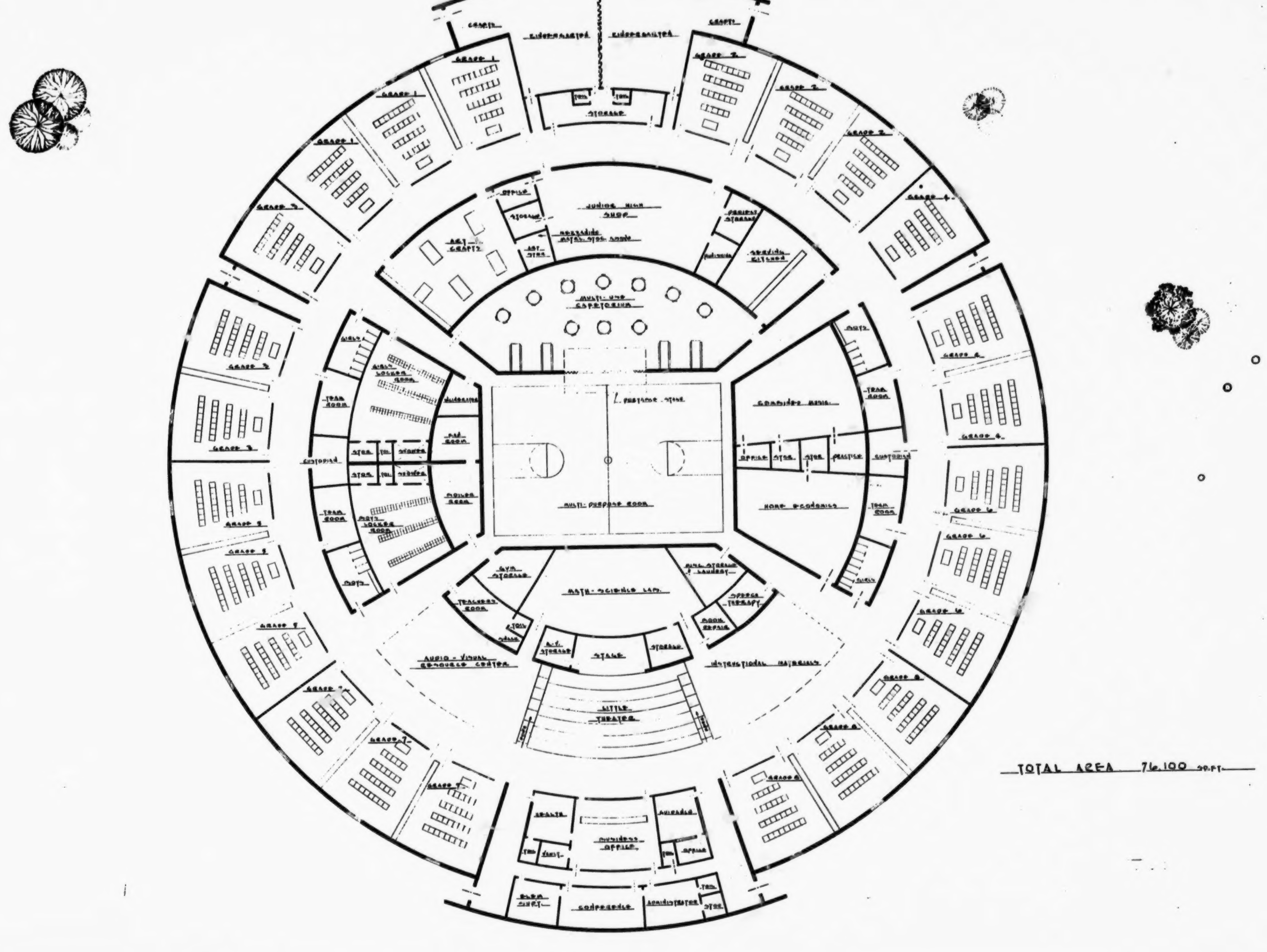
DESIGN COMMENTARY, Continued -

If the teachers elect to do so, the vocal music sessions may be held within each house and there will be no disturbance to the other units. The fact that there is no limitation caused by walls and other built-in nuisances, makes it readily possible to move about freely within each house and the traffic flow is nearly perfect from this standpoint.

Although the hexagonal will not be as economical as the circular plan, it should be very close to the cost of the conventional rectangle. The open plan eliminates much of the heating control work; the electrical system is simplified; there are fewer walls; less painting and lower maintenance / in brief - from the economical standpoint, it has much to offer and little to be concerned about.

If the school district does not have the enrollment sufficiently large enough to take full advantage of the individual house concept, there is no problem in combining two, or possibly three grades per house and thus reduces the total number of pods. Care must be exercised however, to provide the central core facilities for future expansion.

On the subject of future expansion - here again, the hexagonic cluster has definite advantages in that pods can be added at random and the enrollment can be increased for a modest expenditure. If the central core facilities are adequate, there are unlimited expansion possibilities and yet the compact nature of the design will not be lost. There is no question that these designs will become more popular in Wisconsin within the immediate future.


CRAFTS
KINDERGARTEN
KINDERGARTEN
CRAFTS
GRADE 1
GRADE 1
GRADE 1
GRADE 2
GRADE 2
GRADE 2
TOIL.
TOIL.
STORAGE
GRADE 3
GRADE 3
GRADE 3
GRADE 4
GRADE 5
GRADE 5
GRADE 6
GRADE 6
GRADE 6
GRADE 6
GRADE 7
GRADE 7
GRADE 7
GRADE 8
GRADE 8
GRADE 8
OFFICE
STORAGE
JUNIOR HIGH SHOP
ART CRAFTS
ART STOR.
PROJECT STORAGE
SERVING KITCHEN
MULTI-USE CAFETORIUM
PORTABLE STAGE
MULTI-PURPOSE ROOM
GIRLS
GIRLS LOCKER ROOM
TEAM ROOM
CUSTODIAN
STOR.
TOIL.
SHOWER
P.E. ROOM
BOILER ROOM
TEAM ROOM
BOYS LOCKER ROOM
BOYS
COMBINED MUSIC
OFFICE
STOR.
STOR.
PRACTICE
CUSTODIAN
HOME ECONOMICS
TEAM ROOM
TEAM ROOM
BOYS
GIRLS
GYM STORAGE
MATH-SCIENCE LAB.
MISC. STORAGE & LAUNDRY
SPEECH THERAPY
TEACHERS ROOM
TOIL.
BOOK REPAIR
A.V. STORAGE
STAGE
STORAGE
AUDIO-VISUAL RESOURCE CENTER
INSTRUCTIONAL MATERIALS
LITTLE THEATER
HEALTH
GUIDANCE
BUSINESS OFFICE
TOIL.
WAIT.
TOIL.
OFFICE
ELEM. SUPT.
CONFERENCE
ADMINISTRATOR
TOIL.
STOR.

TOTAL AREA 76,100 SQ.FT.

STUDY VII

- BUILDING TYPE STUDIES -

CIRCULAR COMPACT OPEN CONCEPT 26 CLASSROOM UNITS DESIGN CAP.750

Total Building Area	79,000 sq. ft.
Building Area per student	110 sq. ft.
Construction Cost per sq. ft.	$ 11.80
Construction Cost per student	$ 1,240.00
Total Construction Cost	$932,000.00

- LIST OF FACILITIES -

- 26 Academic Classrooms	952 sq. ft. ea.
- 2 Kindergarten Units Include storage room, dual lavatories, crafts area and classroom.	2,100 sq. ft. ea.
- Art & Crafts Lab Includes office, storage and ceramics work area.	2,240 sq. ft.
- Mathematics - Science Combined Lab Includes office, storage and supplies.	1,920 sq. ft.
- Introductory Shop Includes storage area and office.	2,300 sq. ft.
- Domestic Science Lab Includes fitting rooms, storage and office.	2,300 sq. ft.
- Combined Music Suite Includes three practice rooms, storage and office.	1,920 sq. ft.
- Instructional Materials Center (Library) Includes teachers work room, remedial reading, stage, A-V equipment, materials storage, viewing and listening, and large group instruction area.	6,360 sq. ft.
- Student Services Office Includes guidance office, business office, health room, dual lavatories, supplies, principals office, district administrators office.	3,200 sq. ft.
- Boys Locker Room Includes locker room, showers, office, lavatory and storage.	1,600 sq. ft.
- Girls Locker Room Includes locker room, shower, office, lavatory and storage.	1,600 sq. ft.
- Cafeteria .... Capacity 285	3,160 sq. ft.

LIST OF FACILITIES: (Continued)

- Kitchen Includes food storage, dish wash area and serving area.	1,920 sq. ft.
- Multi-purpose Gymnasium	4,800 sq. ft.
- Miscellaneous Facilities: Includes four team rooms, four main students toilets, two janitors closets, boiler room, fan room, storage rooms, etc.	
TOTAL USABLE AREA	79,000 sq. ft.

DESIGN COMMENTARY:

Although very similar to the Cuba City plan, this design for the Oakfield District represents greater emphasis on the open concept wall-less configuration. With the exception of feeder corridors to the multi-purpose room, this school includes a total floor area of 79,000 sq. ft. served by a single corridor. This has been one of the prime reasons for achieving economy through the circular design.

Primarily a K-6 unit, the plan includes facilities for introductory shop, home economics, science, etc. which are not normally found in this enrollment level. Temporarily, we will house seventh and eighth grade in the building and as these grades are relocated, the district will introduce the departmentalized program to the fifth and sixth graders. The locker areas have also been expanded for Junior High purposes, but the gymnasium has not provided for a strong Jr. High athletic program. There will be no bleacher seating in the gym because of the central location within the building.

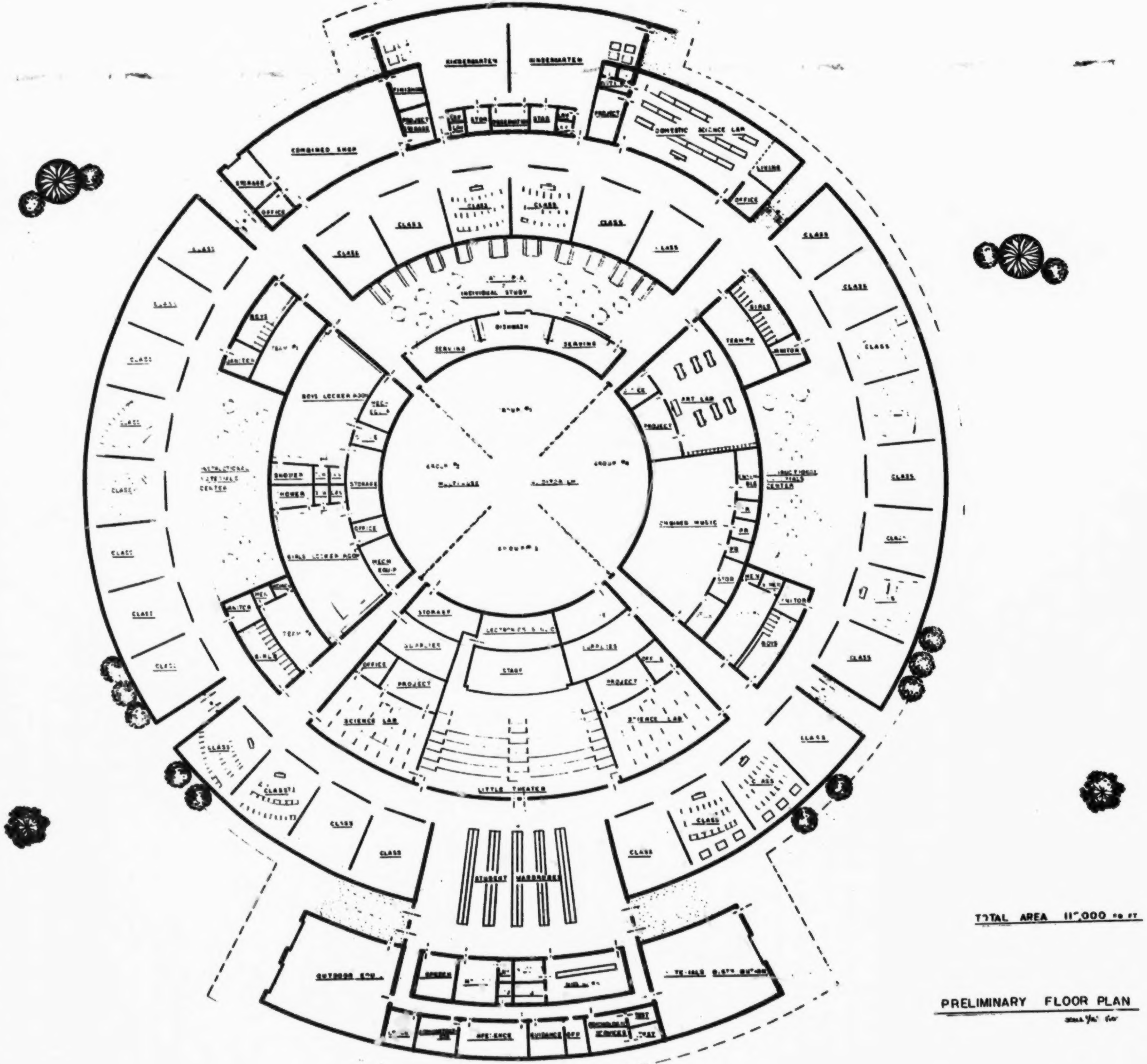
The focal point of the building once again, is represented by the instructional materials center, and this facility includes a small open theater capable of seating 200 pupils on carpeted risers. If seating is included on either side of the risers and along the corricor, the entire enrollment can attend a single program together. This eliminates the need for providing temporary seating in the gymnasium which always represents a nuisance factor to the custodians. The entire instructional materials center, including the theater, encompasses an area of 6,360 sq. ft. which is much larger than found in many modern schools.

Although the location of the multi-purpose room, music, shop, science and other noise areas in the inner core do not present a functional problem, special attention must be given to the acoustical separation. We have found by past experience, that the mere inclusion of acoustical tile ceilings will not solve this problem. As a result, hard-surfaced plaster is applied above the acoustical ceiling to form a definite sound confinement which has proven to be very effective. The surrounding masonry walls are also filled with an acoustical material to prevent penetration through the walls to adjoining quiet zones.

We have finally realized the time that the electors of the district accept carpeting without using this material as an excuse to draw battle-lines. During the past two years, the cost of this material has decreased to a very competitive atmosphere with the higher quality resilient tiles which were so prevalent in our schools several years ago and for the past thirty years. Carpeting that sold for $10 - $11 per square yard several years ago can be purchased today for $6 - $7 per square yard because of the highly competitive bidding by the mills and the suppliers. In this building, approximately 50 to 60 percent of the total floor area will be carpeted.

Another advantage of the circular structure is the simplicity of the framing system and the symetrical patterns which occur in the placement of the steel joist. It is common knowledge that the majority of our modern schools have flat roofs with internal roof drains and - the majority of these roof areas leak. With the circular building it is very simple to slope all roof areas to the exterior of the building with natural drainage provided, thus eliminating many of the "built-in" causes of roof problems. Any district that has experienced roof problems can appreciate the value of this trouble-free design.

In conclusion, this building design has many advantages including low initial cost, low maintenance costs, compact design, rapid traffic flow, and complete flexibility. The weaknesses, if they do exist, might include the location of the noise areas in the central core; however, if proper attention is given to a complete sound separation, this problem is virtually eliminated.


KINDERGARTEN
KINDERGARTEN
FINISHING
PROJECT STORAGE
STOR
STOR
PROJECT
DOMESTIC SCIENCE LAB
LIVING
OFFICE
COMBINED SHOP
STORAGE
OFFICE
CLASS
INDIVIDUAL STUDY
DISHWASH
SERVING
SERVING
BOYS
GIRLS
JANITOR
BOYS LOCKER ROOM
GIRLS LOCKER ROOM
MECH EQUIP
SHOWER
STORAGE
OFFICE
INSTRUCTIONAL MATERIALS CENTER
ART LAB
PROJECT
COMBINED MUSIC
STOR
GROUP
MULTI-USE
AUDITORIUM
STORAGE
SUPPLIES
OFFICE
PROJECT
SCIENCE LAB
STAGE
LITTLE THEATER
STUDENT WARDROBES
OUTDOOR EDU
SPEECH
REFERENCE
GUIDANCE
OFF
TEST
SERVICES

TOTAL AREA 110,000 SQ FT

PRELIMINARY FLOOR PLAN

SCALE 1/32" 1'0"

STUDY VIII

BUILDING TYPE STUDIES -

CIRCULAR COMPACT	OPEN CONCEPT	30 CLASSROOM UNITS	DESIGN CAP. 1000

Total Building Area	115,000 sq. ft.
Building Area per student	115 sq. ft.
Construction Cost per sq. ft.	$ 12.80
Construction Cost per student	$ 1,470.00
Total Construction Cost	$ 1,470,000.00

- LIST OF FACILITIES -

- 30 Academic Classrooms	890 sq. ft. ea.
- 2 Kindergarten Suites Includes 4 lavatories, parents observation room, dual storage rooms, two crafts areas and two class areas.	2,160 sq. ft. ea.
- Combined Shop (Jr. High Level) Includes project storage, finishing, materials storage and office.	3,000 sq. ft.
- Domestic Science Lab Includes fitting rooms, project area, office and family living zone.	3,000 sq. ft.
- Combined Music Department Includes ensemble, three practice rooms, storage and office.	3,300 sq. ft.
- Art and Crafts Lab Includes office & special project area.	2,300 sq. ft.
- Cafeteria - Kitchen Includes serving kitchen to handle dual lines.	5,600 sq. ft.
- 2 Science Laboratories Includes dual offices and dual project rooms.	1,848 sq. ft. ea.
- Little Theatre (Capacity 350)	4,400 sq. ft.
- 2 Materials Centers	3,000 sq. ft. ea.
- Boys Locker Room Includes shower, lavatory, towel room, office and storage.	2,260 sq. ft.
- Girls Locker Room Includes shower, lavatory, towel room, office and storage.	2,260 sq. ft.
- Multi-use Gymnasium	10,000 sq. ft.
- 4 Team Work Rooms	600 sq. ft. ea.

LIST OF FACILITIES - Continued

- Main District Office - Student Services Area .... 8,400 sq. ft.
  Includes outdoor equipment storage, speech therapy, health room, two accounting offices, business office, materials distribution center office, district administrators office, conference, guidance office, principals office, psychological services with dual testing rooms, dual lavatories.
- Miscellaneous Facilities:
  Includes multiple storage rooms, mechanical equipment, main toilet facilities, corridors, four janitors closets, electronics studio, stage, etc.

TOTAL USABLE AREA ....115,000 sq. ft.

DESIGN COMMENTARY:

The Southern Door District was faced with the problem of closing twelve outlying elementary schools and moving the children to a central site. A number of alternate plans were prepared with the final two choices involving a hexagonal plan and the circular plan, which will be discussed in this section. The circular plan encompasses an area of 115,000 sq. ft. and represents the largest single type structure solely for school purposes known to us today.

This building is designed to accommodate and educate 1,000 students ranging from kindergarten thru eighth grade with four class areas given to each grade. Again, the maximum in flexibility was the ultimate goal of the Board and Administrative staff, thus, the basic reason for the open planning. The number of load bearing walls was limited to less than ten, thus in the future most of these walls indicated on the plan may be removed with a minimum of confusion and expense.

This plan differs somewhat from the preceding circular units in that the multi-purpose gymnasium is circular in shape rather than rectangular. This area can be divided in four independent quadrants with four individual activity areas of 2,500 sq. ft. each. This is of particular advantage for activities such as gymnastics, rythmics, physical fitness exercises, etc. The capability of accommodating four different groups is of particular advantage when we consider the total enrollment of 1,000 children. This enrollment represents the maximum number of lower grade level children that we would recommend under one roof. The nature of the district dictates a single facility rather than two smaller units.

DESIGN COMMENTARY - Continued

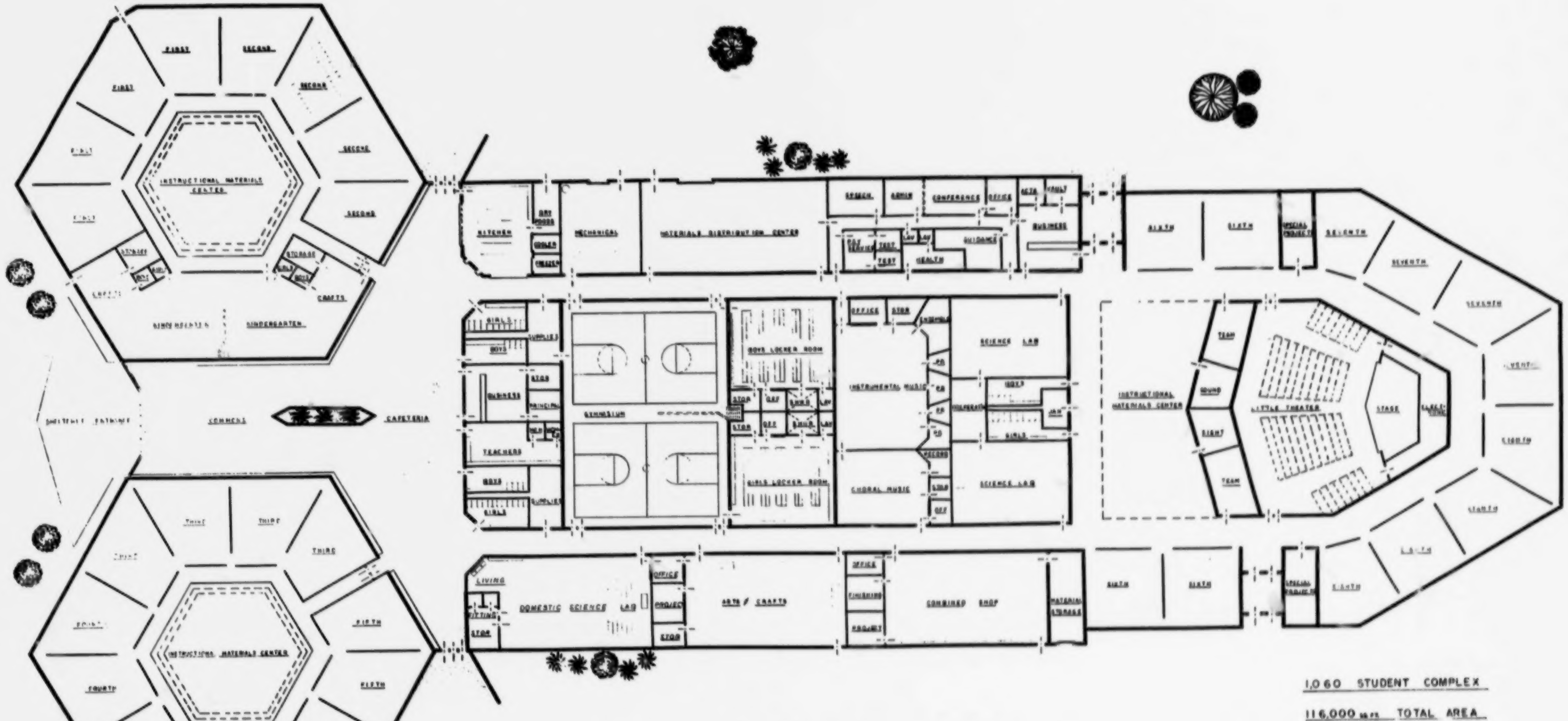
The instructional materials centers were separated into two units in this plan because of the broad range of age levels and materials required. Although the little theater with the carpeted seating arrangement would have gained functionally, had it been placed in the immediate proximity of the materials centers; this plan would not allow this arrangement. Once again, the geometric pattern of the circle allows the children to reach the materials centers by means of a single classroom serving all classrooms.

The State Code requirement of 40 sq. ft. of window area per classroom has already been mentioned and for this reason, all classrooms with the exception of the seventh and eighth grade class areas, have been located along the perimeter walls. The seventh and eighth grade areas are junior high level grades and thus, do not require windows. With this arrangement, provisions have been made to include a complete air conditioning system to serve all areas, including the gymnasium. This air conditioning system will increase the total cost of the building in an amount less than 50 cents per sq. ft., and the operational costs will be very low.

With the wide use of carpeting, it was decided to provide a central student locker area rather than the conventional perimeter arrangement. This concept can be quite controversial because of the argument concerning congestion and noise, however, the reduction in maintenance costs provides a stronger argument for this arrangement. The wet garments are in an open area with special provisions for ventilation and will not present the common problem of odors in the academic class areas.

It has not been decided as to the teaching methods to be used in the non-graded areas, however, team rooms have been provided at strategic locations in the event that team teaching will be used. These rooms are of adequate size to accommodate ten teachers with a maximum of comfort and function. Two of the facilities include dual toilet rooms to serve as teacher lounge areas as well as team work areas.

In the majority of the open space plans presented in this section, maximum flexibility is of prime importance in the mechanical systems as well as the general construction. Planning includes central air handling with ceiling distribution and in some instances, flexible duct work. A lay-in type acoustical tile ceiling in an exposed grid allows flexibility in the lighting arrangement as well as the heating system. The open concept allows a great reduction in the number of light switches, thermostats and air relief grilles which are normally associated with the "self-contaminated" classrooms. We often talk about total flexibility but most designers are not clear in their understanding that this term applies to all features of the building.


FIRST
SECOND
FIRST
SECOND
FIRST
SECOND
FIRST
SECOND
INSTRUCTIONAL MATERIALS CENTER
STORAGE
BOYS
GIRLS
CRAFTS
KINDERGARTEN
KINDERGARTEN
DISTRICT ENTRANCE
COMMONS
CAFETERIA
THIRD
THIRD
THIRD
THIRD
FOURTH
FIFTH
INSTRUCTIONAL MATERIALS CENTER
FOURTH
FIFTH
FOURTH
FIFTH
FOURTH
FIFTH
KITCHEN
DRY FOODS
COOLER
FREEZER
MECHANICAL
MATERIALS DISTRIBUTION CENTER
SPEECH
ADMIN
CONFERENCE
OFFICE
ACTG
VAULT
BUSINESS
TEST
TEST
LAV
LAV
HEALTH
GUIDANCE
GIRLS
SUPPLIES
BOYS
BUSINESS
STOR
PRINCIPAL
TEACHERS
BOYS
SUPPLIES
GIRLS
GYMNASIUM
BOYS LOCKER ROOM
STOR
OFF
SHWR
LAV
GIRLS LOCKER ROOM
OFFICE
STOR
ENSEMBLE
INSTRUMENTAL MUSIC
PR
PR
PR
PR
RECORD
CHORAL MUSIC
STOR
OFF
SCIENCE LAB
BOYS
JAN
GIRLS
SCIENCE LAB
LIVING
FITTING
STOR
DOMESTIC SCIENCE LAB
OFFICE
PROJECT
STOR
ARTS & CRAFTS
OFFICE
FINISHING
PROJECT
COMBINED SHOP
MATERIAL STORAGE
SIXTH
SIXTH
SPECIAL PROJECTS
SEVENTH
SEVENTH
SEVENTH
INSTRUCTIONAL MATERIALS CENTER
TEAM
SOUND
SIGHT
TEAM
LITTLE THEATER
STAGE
SEVENTH
EIGHTH
EIGHTH
EIGHTH
SIXTH
SIXTH
SPECIAL PROJECTS
EIGHTH

ELEMENTARY LEARNING CENTER

SCALE: $\frac{1}{16}$" = 1'

1,060 STUDENT COMPLEX

116,000 sq ft TOTAL AREA

STUDY IX

- BUILDING TYPE STUDIES -

HEXAGONAL-RECTILINEAR COMBINATION - OPEN CONCEPT - 32 CLASSROOMS

DESIGN CAPACITY 1000

Total Building Area	116,000 sq. ft.
Building Area per student	116 sq. ft.
Construction Cost per sq. ft.	$ 14.20
Construction Cost per student	$ 1,650.00
Total Construction Cost	$1,650,000.00

- LIST OF FACILITIES -

- 32 Academic Class Areas	952 sq. ft. ea.
- 2 Kindergarten Suites Includes crafts areas, class areas, dual lavatories and storage room.	1,836 sq. ft. ea.
- 2 Materials Centers	2,675 sq. ft. ea.
- Commons & Cafeteria	10,600 sq. ft.
- Serving Kitchen	1,164 sq. ft.
- Domestic Science Lab Includes storage, dual fitting rooms and office.	2,600 sq. ft.
- Combined Shop Includes electronics lab, finishing room, office, materials storage and project storage.	3,600 sq. ft.
- Little Theater ..... Capacity 420 Includes stage, electronics studio and storage.	5,200 sq. ft.
- Materials Center (Junior High) Includes A-V storage, control, sound, sight, teachers room and dual lavatories.	5,400 sq. ft.
- 2 General Science Rooms	1,500 sq. ft. ea.
- Choral Music Includes recording room, storage and office.	1,400 sq. ft.
- Instrumental Music Includes office, storage, ensemble and four practice rooms.	3,000 sq. ft.
- Boys Locker Room Includes shower room, lavatory and storage.	1,200 sq. ft.
- Girls Locker Room Includes shower room, lavatory and storage.	1,200 sq. ft.

LIST OF FACILITIES - Continued

- Multi-Purpose Gymnasium Includes stage and stage storage.	6,200 sq. ft.
- Business Office Includes Business office, storage and principals office.	880 sq. ft.
- District Offices and Student Services Includes Business office, guidance, nurse, health, psychological services, testing rooms, social services, accounting, storage, Administrators office, dual offices, conference, speech therapy, dual lavatories and materials distribution center.	6,000 sq. ft.
- Arts & Crafts Lab Includes special project room, ceramics area, office and storage.	2,800 sq. ft.
- Miscellaneous Facilities: Mechanical equipment, teachers room, special project rooms, toilets, corridors, janitors closets and miscellaneous storage.	
TOTAL USABLE AREA	116,000 sq. ft.

DESIGN COMMENTARY:

An interesting approach to the design problem offered at Southern Door is the combination of the hexagon and rectangle represented in this design study. We have already discussed the alternate plan represented by the circular solution; this plan is the one selected by the teachers and citizens committee. The Board of Education had visited several circular schools and they preferred the round plan. Although the facilities offered by both plans are quite similar, the function of the two units is entirely different. Both feature the open concept approach, but that is where the similarity ends.

The strength of the design under consideration is evidenced by the complete separation of age levels in three areas; K-3, 4-5, 6-8. This separation of grade and age levels was of particular concern to the teaching staff and it would have been nearly impossible to accomplish in a rectilinear or circular building. The strength of opinion concerning the necessity for separation varies from district to district, but the majority appear to share the position of the Southern Door teachers.

Once again, the instructional materials center areas are located in a central position equally accessible from all of the surrounding class areas. The question of whether or not to depress the materials center at a lower level came up during the planning. In Southern Door, the teachers preferred all facilities to be located at one level. With the inclusion of the spacious little theater in the junior high section, the need for the steps in the materials centers diminished and eventually they were abandoned in the planning.

Aside from the educational function of the building, another current trend is evidenced in the design. The district offices are separated from the school offices and all of the student services are located in the district offices, primarily because these services will be used by the high school as well as the elementary. In this instance, the two schools will share one 80 acre rural site and there will be an interchange of students between the two units. The little theater will be used for both enrollments.

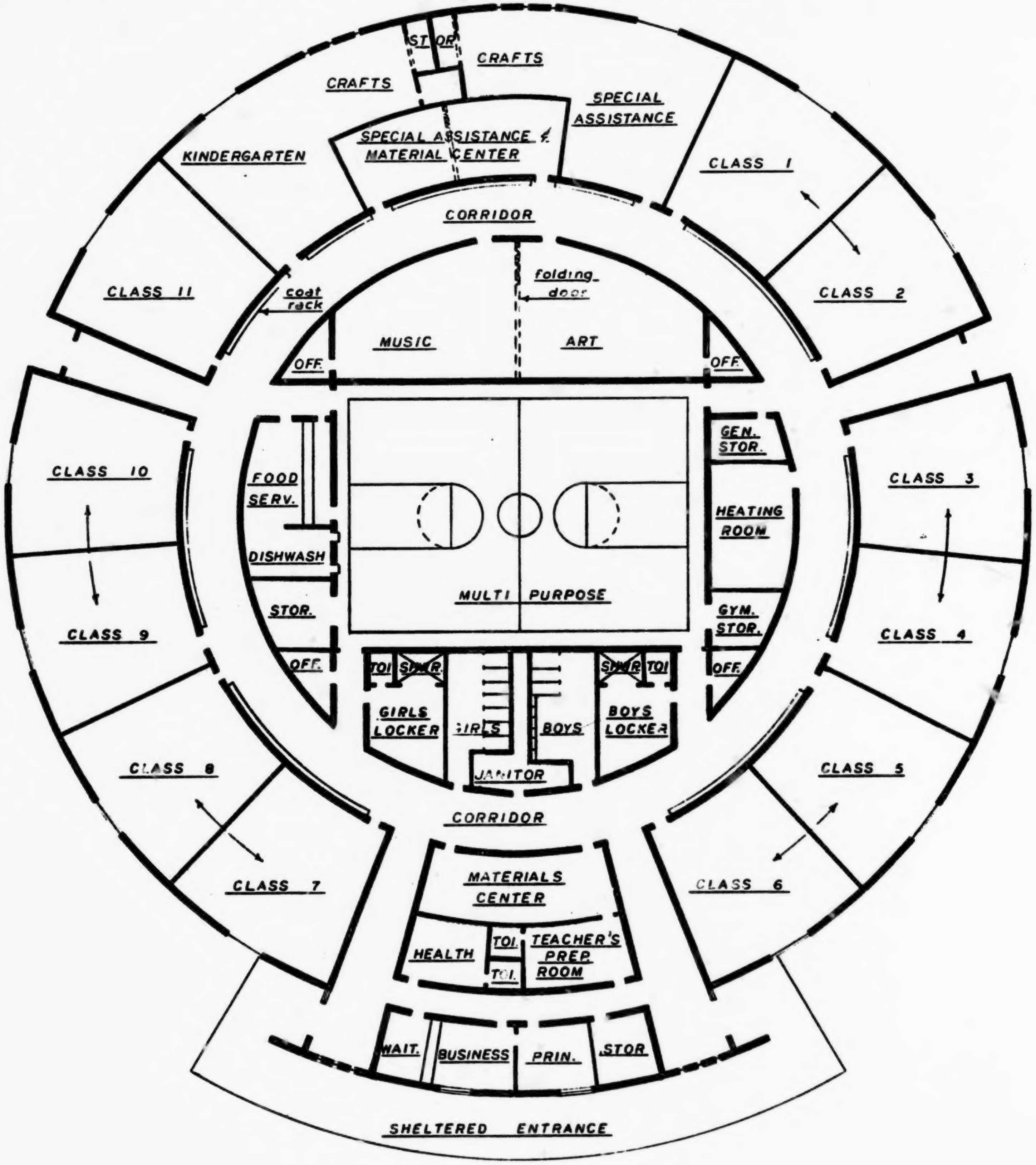
The weakness is, this plan centers about the physical education facilities and the presence of wasted corridor space in the rectilinear portion. The locker rooms are cramped, although adequate if the grades below fifth do not use these facilities to shower. Alone, the gymnasium will not adequately handle 1000 students, even though it is large enough to be divided into two class areas. We have adequate space in the cafeteria and commons to conduct rythmics and light physical activities, and the junior high school students may share the high school gymnasium which is not completely scheduled at this time. There is a strong possibility of a future swimming pool which will also ease the phy-ed problem.

The theater planned for this building will feature semi-permanent type seating because of the shared use with the high school students. The capacity of 450 students is more than adequate and normally we would recommend a capacity of between 100 and 300 students, dependent upon the type of program involved. The theater will be quite simple with a minimum of aesthetic frills yet it will be capable of division into at least two sections.

As Southern Door is fortunate to have a progressive staff, extensive provisions will be made to accommodate complete electronic control centers including facilities for closed and open circuit educational T.V., dial-selectric programming and electronic study carrels. Our firm has taken a dim view of schools we have visited with wall-to-wall study carrels, because of the space limitations for the students. Although we normally provide these units, they are not purchased in great quantity because of the restrictions they impose.

DESIGN COMMENTARY: Continued

A number of educators have commented favorably concerning the functional possibilities of this plan, particularly for the large enrollment involved. In recognition of the fact that there will never be a perfect school building, there are definite weaknesses in this plan as well. However, with the difficult enrollment spread and desired separation of age levels, the plan does solve many of the district needs at a reasonable cost.


STOR
CRAFTS
CRAFTS
SPECIAL ASSISTANCE
KINDERGARTEN
SPECIAL ASSISTANCE & MATERIAL CENTER
CLASS 1
CORRIDOR
CLASS 11
coat rack
folding door
CLASS 2
MUSIC
ART
OFF.
OFF.
CLASS 10
FOOD SERV.
GEN. STOR.
CLASS 3
HEATING ROOM
DISHWASH
MULTI PURPOSE
CLASS 9
STOR.
GYM. STOR.
CLASS 4
OFF.
TOI
SHWR.
SHWR.
TOI
OFF.
GIRLS LOCKER
GIRLS
BOYS
BOYS LOCKER
CLASS 8
JANITOR
CLASS 5
CORRIDOR
MATERIALS CENTER
CLASS 7
CLASS 6
HEALTH
TOI.
TOI.
TEACHER'S PREP ROOM
WAIT.
BUSINESS
PRIN.
STOR
SHELTERED ENTRANCE

TOTAL USABLE AREA - 31,000 SQ. FT.

PRELIMINARY PLAN	PROPOSED ELEM. LEARN JT. SCHOOL DIST. #5 RIO.	
THERN ASSOCIATES INC.	DRAWN :	L.J.W.

STUDY X

- BUILDING TYPE STUDIES -

CIRCULAR COMPACT	11 CLASSROOM UNIT	DESIGN CAPACITY 300

Total Building Area		30,200 Sq. Ft.
Building Area per Student		100 Sq. Ft.
Construction Cost per Sq. Ft..........		10.20
Construction Cost per Student	$	1,030.00
Total Construction Cost	$	318,620.00

- LIST OF FACILITIES -

- 11 Academic Classrooms	960 Sq. Ft. Ea.
- 1 Kindergarten Suite w/Crafts	1,320 Sq. Ft.
- 1 Special Assistance Suite w/Crafts.......	1,320 Sq. Ft.
- Elementary Music Suite	800 Sq. Ft.
- Elementary Art Suite	800 Sq. Ft.
- Special Assistance Classroom	770 Sq. Ft.
- Multipurpose Room	3,500 Sq. Ft.
- Dual Locker & Shower Facilities	300 Sq. Ft.
- Food Service Area	500 Sq. Ft.
- Miscellaneous Facilities: Includes: Toilets, Storage, Offices, Etc.	
- Administrative Suite	960 Sq. Ft.
TOTAL USABLE AREA	30,200 Sq. Ft.

DESIGN COMMENTARY -

In considering the circular plan for the Southern Door District, it was mentioned that the plan, with 116,000 square feet, represents the near maximum for a single circular unit. The Rio Elementary plan represents the other side of the coin as the area of 31,000 square feet represents the near minimum for a circular unit to be economical. The economy is a direct function of size in the circular unit - the size is a direct function of the radii and this tells the story. If the radii falls below 100 feet, the curviture becomes critical, particularly with respect to the inner walls. The masonry work becomes more difficult and the structural system begins to lose efficiency because of the reduced span and wedged placement of the individual members. Below 30,000 square feet, both the designer and the owner must take a long look at the circle to decide upon the wisdom of their selection.

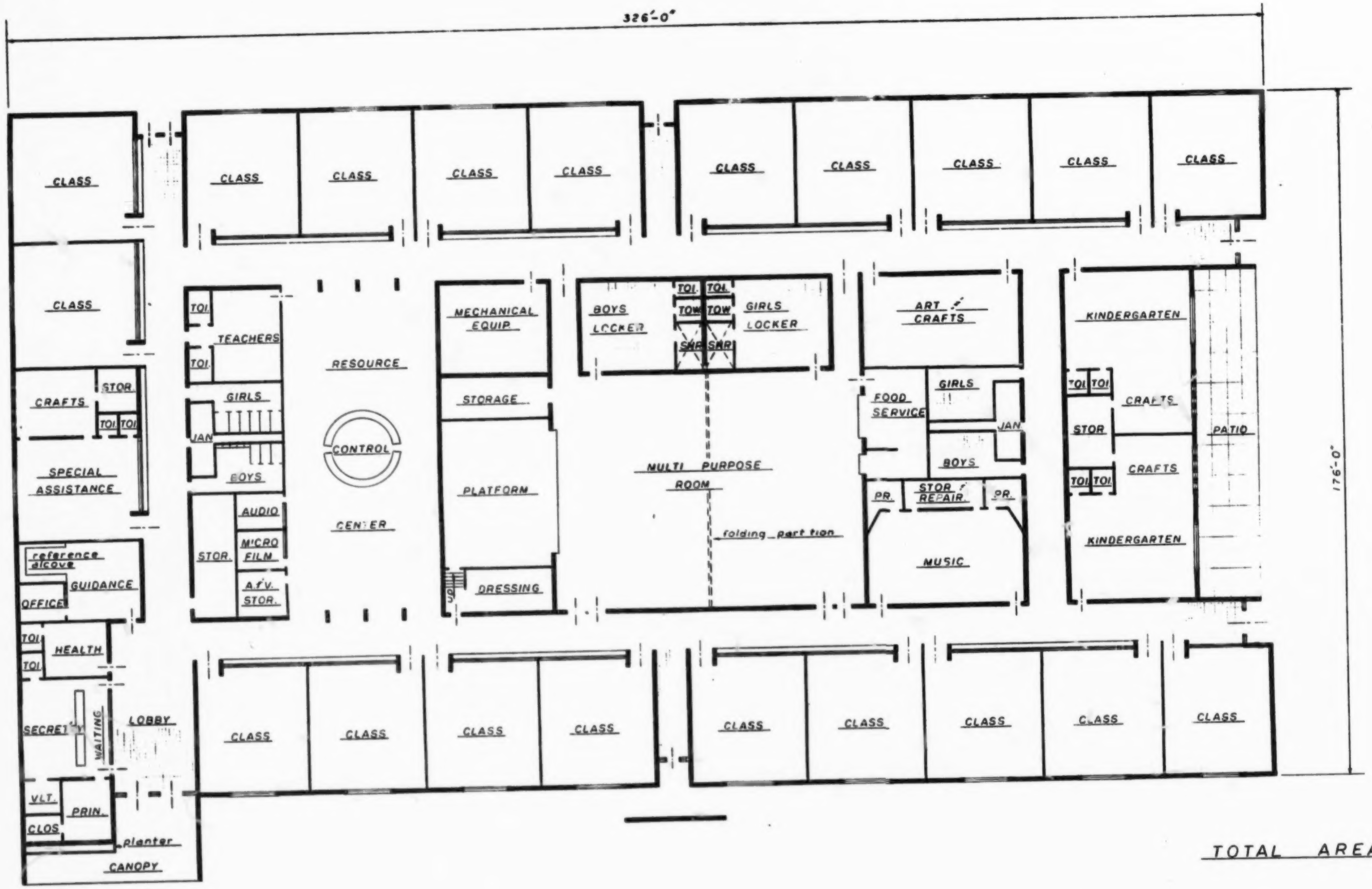
The classrooms and kindergarten suites are spacious, and although we would have preferred carpeting in some areas, the budget could not be stretched. The classrooms are designed to allow team teaching in the future through the removal of the non-load bearing masonry walls dividing the classrooms. It is doubtful that this will occur in the district because of the conservative teaching practices now in effect. The fact that the building was equipped by the owner for less than $30,000 or less than 10% of the building cost, also serves notice of this fact. If possible, we recommend that between 15% and 20% of the construction cost be allocated for equipment and predictions have been given by leading educators that in the future, the equipment cost will exceed the cost of the building.

We were able to provide adequate facilities for music and art laboratories and locker-shower facilities, but, obviously the materials resource center leaves much to be desired. It has become a place to store books and the children are not given access to the room. This room, under an effective teaching program, should be much larger and well equipped and it is probably a misnomer to call it a materials center --- 'storeroom' would be a better description. We emphasize this point because we have encountered many other schools of recent vintage with the same lack of adequate space and equipment in the resource center. Some of these have been caused by a tight budget --- others, because of design over-sights.

Because of the circular design, we were able to afford the owner with more usable space and we have a cost factor at least two dollars per square foot less than our conventional designs. However, we have not provided as many of the auxiliary facilities as we would normally recommend and the school could have been improved under more relaxed budget conditions.

The mechanical system involving the control air distribution has been a very pleasing success as compared to our more expensive systems in our rectangular buildings. The distribution is uniform and the system is completely simple and economical to operate. The electrical distribution, which is not common, also justified the design in both function and economy, although we were not pleased with the appearance of the switch plate covers in the classrooms. Since that time, we now have available a much more compact unit that can be covered with the standard stainless steel cover. We have found an excessive amount of noise transfer through the fiberglas acoustical tile ceiling which is suspended in an exposed grid, and we have corrected this problem through the substitution of mineral fibre tile of the same dimensions, mounted in a like manner.

Another feature of flexibility in this structure, is the ceiling design in that the tile can be removed with no effort and all of the electrical and piping conduit can be reached in a matter of seconds. We do not have those mechanical runs in the floor slabs or inaccessible pipe trenches, which are so common, including our earlier projects. Once again, we find ourselves designing for flexibility and not tradition.


326'-0"
176'-0"
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CRAFTS
STOR
TOI
TOI
SPECIAL ASSISTANCE
reference alcove
GUIDANCE
OFFICE
TOI
TOI
HEALTH
SECRET'Y
WAITING
LOBBY
VLT.
PRIN.
CLOS
planter
CANOPY
TOI
TEACHERS
TOI
GIRLS
JAN
BOYS
STOR.
AUDIO
M'CRO FILM
A.V. STOR.
RESOURCE
CONTROL
CENTER
MECHANICAL EQUIP
STORAGE
PLATFORM
DRESSING
UP
BOYS LOCKER
TOI
TOI
TOW
TOW
SHR
SHR
GIRLS LOCKER
MULTI PURPOSE ROOM
folding partition
ART & CRAFTS
FOOD SERVICE
GIRLS
JAN
BOYS
PR.
STOR & REPAIR.
PR.
MUSIC
KINDERGARTEN
TOI
TOI
CRAFTS
STOR
CRAFTS
TOI
TOI
KINDERGARTEN
PATIO
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS
CLASS

TOTAL AREA 59,000 SQ FT.

PRELIMINARY FLOOR PLAN

SCALE 1/16" = 1'-0"

STUDY XI

- BUILDING TYPE STUDIES -

RECTANGULAR - FULLY COMPACT   20 CLASSROOM UNIT   DESIGN CAPACITY 615

Total Building Area	59,000 Sq. Ft.
Building Area per Student	96.0 Sq. Ft.
Construction Cost per Sq. Ft.	$ 13.15
Construction Cost per Student	$ 1,160.00
Total Construction Cost	$ 775,000.00

- LIST OF FACILITIES -

- 20 Academic Classrooms	30 Ft. x 32 Ft.
- 2 Kindergarten Suites	1400 Sq. Ft. Ea.
- Arts & Crafts Laboratory	860 Sq. Ft.
- Music Department Includes Practice, Storage, Office	1520 Sq. Ft.
- Serving Kitchen	560 Sq. Ft.
- Multipurpose Room	4800 Sq. Ft.
- Boys & Girls Locker Rooms Includes Showers, Towels, Toilets	572 Sq. Ft.
- Materials Resource Center Includes Audio, Microfilm, A-V Storage	3200 Sq. Ft.
- Special Assistance Includes Crafts, Toilet, Storage	1310 Sq. Ft.
- Office Suite Guidance, Principal, Business, Health Includes Toilets, Vault, Storage	1860 Sq. Ft.
- Miscellaneous Facilities Includes Dual Toilets, Mechanical Equipment, Storage, Teacher's Room, Stage, Dressing Rooms, Etc.	
TOTAL USABLE AREA	59,000 Sq. Ft.

DESIGN COMMENTARY -

A representation of compact planning, this facility has the enrollment and budget available to expand the central core offerings. Although the classrooms are self-contained cells in appearance, provisions have been included to allow team-teaching in the future. The walls dividing the classrooms are non-load bearing, and may be removed at any time. These walls may be replaced by movable walls and the doors have been spread to allow this improvement. Unfortunately, the budget would not allow the inclusion of small group instruction rooms and quest areas, but, we recognize the advantage of these rooms.

DESIGN COMMENTARY, Continued -

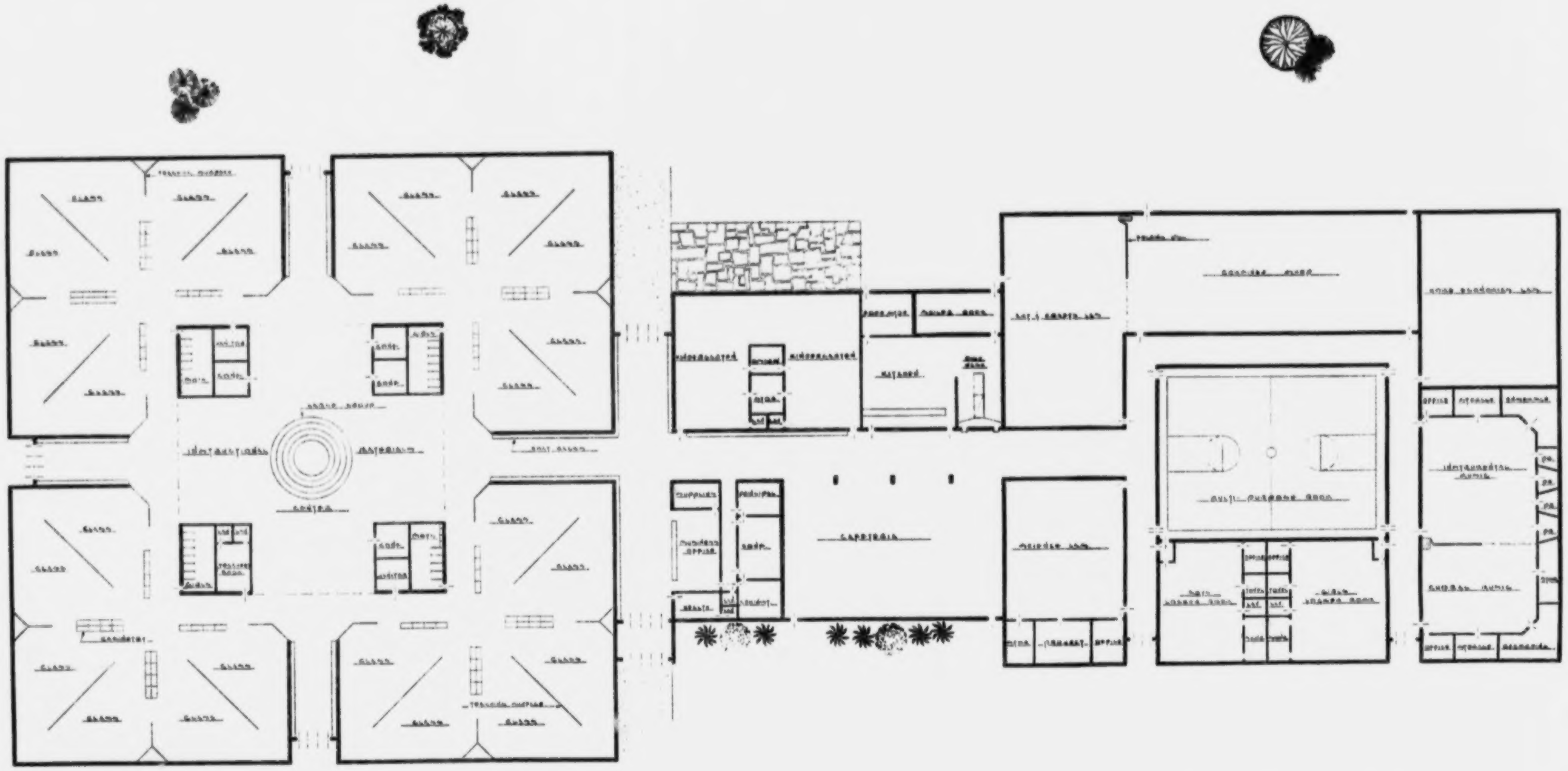
The latter facility includes approximately 3,200 square feet, and is actually larger than the gymnasiums provided in the earlier plan. Now, we can see the increased emphasis that is placed on the child's individual study habits, and the facilities required to enhance these habits.

The central core has become a prominent portion of the building and only the academic classrooms and offices remain along the perimeter because of the current window requirement. We have been questioned because of the potential noise problems which may be caused by the central core, but, to date we have had no complaints from the owners and the design has proven to be very popular with other designers.

Several areas of concern are the absence of separate cafeteria which increases the burden placed on the multi-purpose room. This room will not be available during the noon-hour which is unfortunate as the children will not be allowed a play area during inclement weather. Most educators realize the problems caused by attempting to combine these facilities and it is highly questionable as to the wisdom of this practice - which has become so common. In fact, we have found that many facilities which are designed for multi-use actually don't function well for any given situation and are, therefore, questionable space allocations.

Although we mentioned earlier that the classrooms walls are non-load bearing and may be removed in the future, it is highly questionable as to whether or not this removal will ever occur. It seems that once the building is completed, it is forgotten, and as long as we can squeeze the children into it --- it is adequate.

Another problem that we recognize in this design is typical of the rectangular design and that is the problem of intersecting corridors. It is common knowledge that stairways, inter-secting corridors and similar situations cause traffic flow delays and safety problems. Here again, is one important advantage of the circular and hexagonal design.


CLASS
KINDERGARTEN
KITCHEN
CAFETERIA
INSTRUCTIONAL
MATERIALS
CENTER
ART & CRAFTS LAB
SCIENCE LAB
MULTI-PURPOSE ROOM
HOME ECONOMICS LAB
INSTRUMENTAL MUSIC
CHORAL MUSIC
OFFICE
STORAGE
PRINCIPAL
SUPPLIES
BUSINESS OFFICE
PR.

TOTAL AREA 86000 SQ FT

ELEMENTARY LEARNING CENTER (K-8)

STUDY XII

- BUILDING TYPE STUDIES -

RECTANGULAR PLAN - OPEN CONCEPT - 24 CLASS UNITS - DESIGN CAPACITY 700

Total Building Area	86,000 sq. ft.
Building Area per student	122 sq. ft.
Construction Cost per sq. ft. (Est.)$	13.20
Construction Cost per student (Est.)$	1,625.00
Total Construction Cost (Estimated)	$1,135,000.00

- LIST OF FACILITIES -

- 24 Academic Class Areas	1,000 sq. ft. ea.
- Materials Center - Library	6,340 sq. ft.
- 2 Kindergarten Suites .... Includes common office, storage, toilet facilities.	1,530 sq. ft. ea.
- Food Preparation Kitchen	2,500 sq. ft.
- Administrative Offices & Student Services Includes business office, health room, dual lavatories, conference room, principals office.	1,830 sq. ft.
- Cafeteria - Commons	3,550 sq. ft.
- Art & Crafts Lab	2,880 sq. ft.
- Combined Science Lab .... Includes office, storage, special projects area.	2,560 sq. ft.
- Combined Shop	4,000 sq. ft.
- Domestic Science (Home Ec) Lab	2,760 sq. ft.
- Instrumental Music .... Includes offices, storage, ensemble and four practice rooms.	2,484 sq. ft.
- Choral Music .... Includes storage, recording, office.	1,840 sq. ft.
- Multipurpose Room	4,800 sq. ft.
- Boys Locker Room .... Includes shower, lavatory, towel room and office.	1,500 sq. ft.
- Girls Locker Room .... Includes shower, lavatory, towel room and office.	1,500 sq. ft.
- Miscellaneous Facilities: Corridors, janitors room, conference rooms, toilet facilities, storage, mechanical equipment, etc.	
TOTAL USABLE AREA	86,000 sq. ft.

DESIGN COMMENTARY:

Although the K-8 enrollment center is no longer common in most districts because of the Junior High and Middle School desirability, there are still a number of smaller districts with limited tax bases that cannot afford to separate the grades as they would prefer. The plan presented here provides a semi-departmentalized program along with the basic class area or homeroom philosophy. The additional areas given to Shops, Home Ec, Music, Art and Science do not allow an increase in enrollment capacities as would normally be the case in the Junior High - Middle School. In our situation, these facilities are merely auxiliary in nature and the enrollment figure of 700 students is based solely on 24 academic classrooms and two kindergarten suites.

> Once again in recognition of the predominant role played by the Materials Center - Library complex, the basic planning centered about this facility. One of the immediate problems encountered was the difficulty in surrounding a central resource area with 24 class areas all equidistant from the center. The fact that a conventional rectangle or square was deemed more acceptable to the public in this particular district also served to compound the problem. Our emphasis on the function of the materials center becomes obvious when we point out that this facility includes more than 6,000 sq. ft. of open area exclusive of the conference rooms and other auxiliary facilities. There is a distinct opportunity to add more class areas in this central core without changing the total building size thus providing growth possibilities without additional capitol expenditures.

Past experience has dictated that the open concept functions to the best advantage when the teaching walls are separated, thus affording the teacher in particular with a reasonable sense of privacy. At first glance it might appear that the triangular shaped class areas are not adequate as far as space is concerned. However, each area encompasses at least 1000 sq. ft. which would indicate in fact that each class area is equivalent to a classroom approximately 32'x32' in rectilinear dimensions. Therefore, in the academic class area we find 24 units of 1000 sq. ft. each for a total of 24,000 sq. ft. This combined with the open material center yields a total of 32,000 sq. ft. of class and individual instructional area. Compare these figures with many of our conventional schools and we find that we have the space that we need.

> In each cluster of six academic areas, there are no permanent walls and the only visual separation is provided through the use of cabinetry and teaching surfaces of tackboard and chalkboard. All of this equipment is provided with casters thus allowing complete flexibility in movement. We might expect that in ten years the class areas may be changed several times without difficulty and the entire teaching concept may be totally different from the first several years of operation.

DESIGN COMMENTARY - Continued

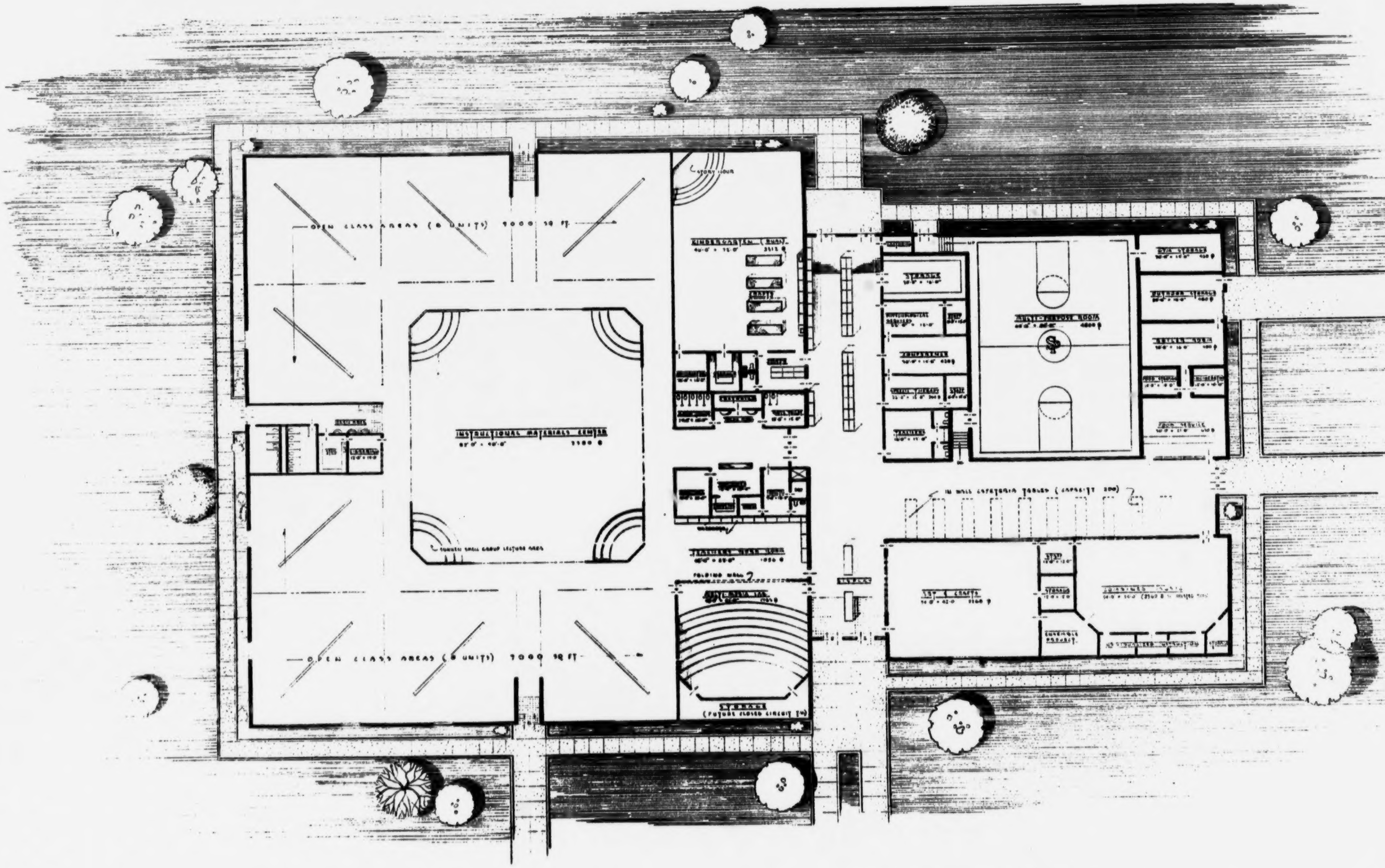
In the more distant future the class areas may be eliminated in total with the entire academic wing assuming the role of a central core for dissemination of material and information. The educators may divorce themselves from the familiar role of classroom teacher and become "course counselors" for the individual child. This possibility in itself should clearly dictate the need for total flexibility.

As opposed to the circular plan in particular, we find another strength within this particular plan in the complete separation of noise oriented activity areas from the quiet zone or acedamic wing. The importance of this feature must be determined by each administrator as additional costs are involved as well as a more complex traffic pattern. All factors must be considered before decisions are presented to the designer.

Other than the open concept planning and orientation of the academic - library complex, the plan does not indicate any sharp departures from the conventional. The folding wall separating the art lab from the shop allows a shared use of both facilities and the equipment therein, which is becoming more important as programs and budgets become strained. The inherent cost advantages of hexagon and circle have been lost, yet the plan maintains an air of simplicity and flexibility which will obviously result in an attractive cost factor as compared to many of the more complex designs to which we are accustomed.

One extremely important factor concerning function which has not been completely defined is the positioning of the student wardrobe units. We are convinced that carpeted surfaces, maintenance costs and the open concept are not compatable with the wardrobe units located away from the common entrances to the building. A central locker-wardrobe area is ideally located by the main entrances but once again, the cost factor of a separate area becomes paramount. We have found that some districts and administrators condition the children to respect this problem whereas, in other schools, the children are totally undisciplined and the maintenance problem becomes severe. In reality, doesn't this inherent problem apply to every school?

In conclusion, this plan has one distinct advantage as opposed to the more sophisticated circular and hexagonal plans, in that the district electors will not regard it with fear. It is conventional in shape and will not be responsible for adverse votes because "it is different". The function is different but this fact is not as apparent in this plan as compared to many of the others in this section. All of us know that tradition is foremost in the minds of most people and this plan will satisfy that psychology. The cost factor although very favorable, will not be competitive with the circle in particular, and the hexagon in most instances. Once again, each strength and each weakness must be considered in depth before any plan is selected.


OPEN CLASS AREAS (8 UNITS) 7000 SQ FT
STORY HOUR
KINDERGARTEN (DUAL)
INSTRUCTIONAL MATERIALS CENTER
SUNKEN SMALL GROUP LECTURE AREA
FOLDING WALL
STORAGE
(FUTURE CLOSED CIRCUIT TV)
OPEN CLASS AREAS (8 UNITS) 7000 SQ FT
STORAGE
MULTI-PURPOSE ROOM
SP
GYM STORAGE
FOOD SERVICE
IN WALL CAFETERIA TABLES (CAPACITY 300)
ARTS & CRAFTS
STAFF
STORAGE
ENSEMBLE PRACTICE

PROPOSED SOUTH PARK ELEMENTARY SCHOOL   OSHKOSH, WISCONSIN

SCALE 1/16" = 1'-0"

THERN ASSOCIATES INC.   OSHKOSH, WISCONSIN

STUDY XIII

- BUILDING TYPE STUDIES -

SQUARE PLAN OPEN CONCEPT 16 CLASS UNITS DESIGN CAPACITY 500

Total Building Area	60,800 sq. ft.
Building Area per student	122 sq. ft.
Construction Cost per sq. ft...	$ 13.25
Construction Cost per student..	$ 1,610.00
Total Construction Cost	$880,600.00

- LIST OF FACILITIES -

- 16 Academic Classrooms .... 1008-1052 sq. ft. ea.
- Dual Kindergarten Suite .... 4,100 sq. ft.
  Includes observation room, storage, dual lavatories and coat area.
- Instructional Materials Center(Library)7650 sq. ft.
  Includes librarians work room.
- Multi-media Lecture Room .... 2,300 sq. ft.
- Student Services - Administrative Area.. 1,820 sq. ft.
  Includes principal office, business office, supply room, health, dual lavatories, teachers preparation room.
- Arts & Crafts Laboratory .... 2,000 sq. ft.
- Combined Music Facility .... 2,600 sq. ft.
  Includes office, storage and ensemble.
- Multi-purpose Activity Room .... 4,800 sq. ft.
- Miscellaneous Facilities:
  Psychological services office, conference room, speach therapy, teachers room, supply storage, cafeteria area, food service kitchen, boiler room, toilet facilities, janitors closets, etc.

TOTAL USABLE AREA .... 60,800 sq. ft.

DESIGN COMMENTARY:

This sixteen classroom unit is quite similar to the preceeding plan however, the program more closely resembles that dictated by the current trend of grade separation throughout the nation. In this unit proposed for the Oshkosh system, we are considering a kindergarten thru fifth grade enrollment with the open class area approach. Here again, a traditional exterior shape and appearance was selected because of potential public acceptance rather than utilizing the more functional and economical hexagonal or circular configuration.

To provide the materials center - library as the functional "hub" of the academic section, it was decided to use a perfect square for the geometric shape. In this manner, all academic class areas are equidistant from the center. This functional objective would be virtually impossible had the conventional rectangle been used in place of the square. Once again, the function has dictated the shape of the structure.

One very interesting feature of this building involves the structural and roof framing system which has been designed to provide complete flexibility. The academic section includes 40,000 square feet of floor area and the roof sheltering this area is supported by four columns. Therefore, it may be said for comparative purposes, that one column is responsible for the roof support of 10,000 square feet in floor area. The entire structural system is extremely economical because of the symetry and repetition of identical span lengths.

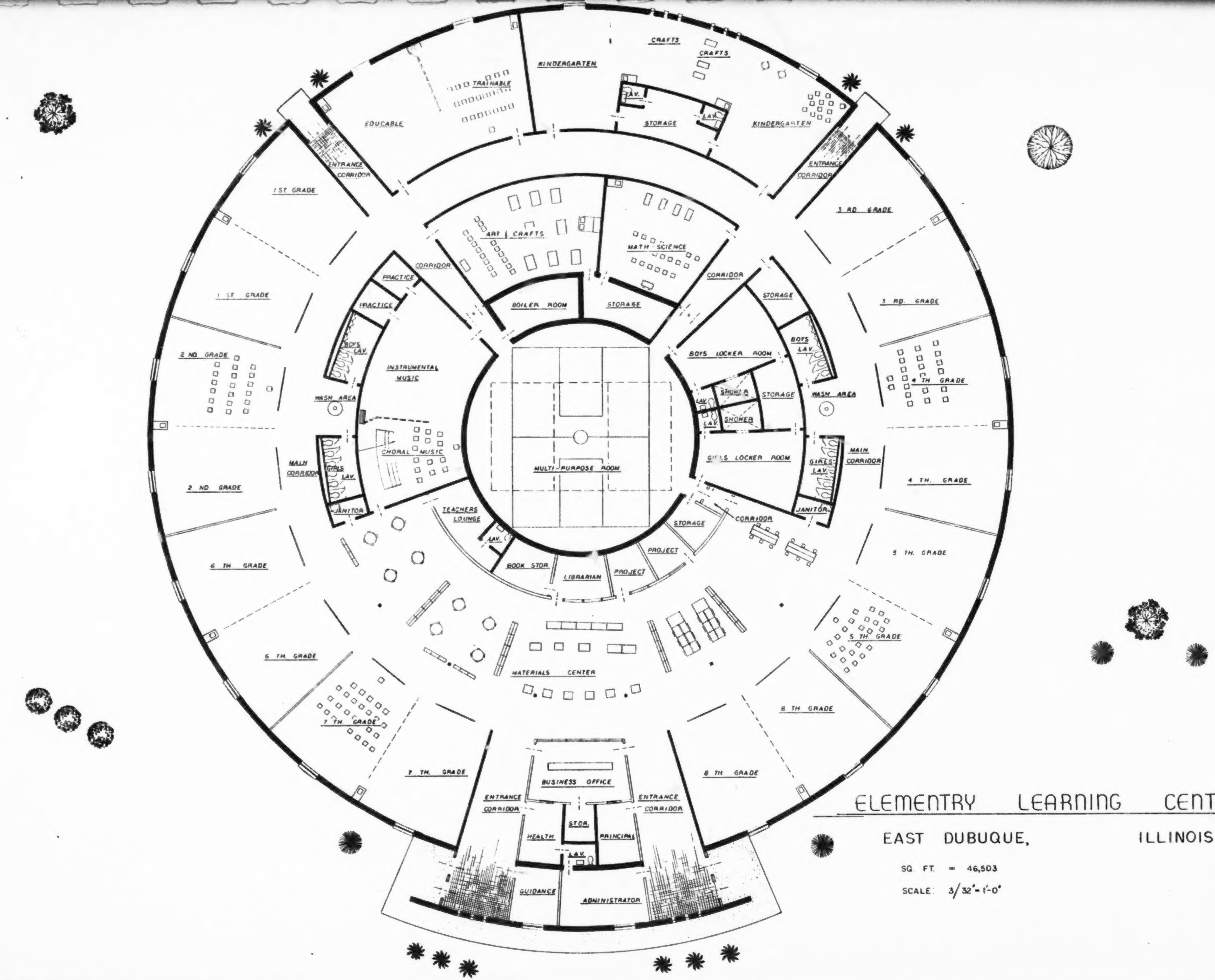
The kindergarten suite actually provides space for two sections of children at any single time with 2,000 square feet provided for each section. It might be possible, in the future, to allow as many as 80 children in the facility for any given one half day session and the space provided would still surpass that provided in the majority of our schools in Wisconsin. It has been quite well proven in other districts that the kindergarten sessions no longer require expensive duplication of facilities such as storage and lavatories which would occur in the independent cell approach. In this concept of programming we can find an ideal cause for the services of para-professionals to supplement the professional staff.

As pointed out in the previous discussion one point which may appear obvious, but one which is very often overlooked until the building is occupied - that is the problem of student wardrobe units. There is no question about the economical advantages of carpeting vs. resilient floor tile but to gain these advantages, we must use a little common sense. It is becoming more apparent that central coat storage facilities near the main entrances and/or exits will restrict the severe dirt problem in a concentrated area. This confined area should not be carpeted nor should the student be forced to walk over the carpeted areas to reach the coat storage space. We have schools designed in both manners and where we failed to use this basic logic, we have caused needless problems with respect to every day cleaning maintenance. These problems have come back to haunt us with shocking clarity.

DESIGN COMMENTARY: (Cont.)

Another problem which confronted the planning team was the question and expense of providing a separate cafeteria. We do not believe that the multi-purpose activity center should be restricted from the planned function for two hours to serve as a cafeteria. This space should be available for physical activity every hour of the day and the lunch program should be in a separate area. In one of the first sketches we had included a separate cafeteria facility of approximately 3,200 square feet. Unfortunately, we found that other facilities of higher priority would have to be deleted to allow us to meet the budget limitations. The solution which seemed to satisfy all concerned was to increase the width of the corridor to provide a space for "in-wall" type dining tables. Instead of 3,200 square feet we found that by increasing the building size an additional 800 square feet, we could force the corridor to serve a dual function during the noon hour. Therefore the gymnasium did not become burdened with a food service and dining function.

In conclusion, this plan represents an effort to gain maximum flexibility at a minimum cost. As the project has not been bid to date, we have no reason to believe that it will, in fact, cost $13.25 per square foot as estimated. There is reasonable evidence to support our belief that the actual unit cost may be slightly under $12.00 per square foot including 40,000 square feet of carpeting and a complete air-conditioning system. This may cause a few questions concerning the veracity of our estimate but we are certain that the bidding will prove to all involved that the building will cost well under $13.00 per square foot. We have estimated that the equipment and furnishings will cost approximately $120,000 or roughly $2.00 per square foot. The equipment would be of the highest quality and will not be limited because of an inadequate equipment budget caused by a monumental type structure.


CRAFTS
CRAFTS
KINDERGARTEN
TRAINABLE
EDUCABLE
LAV.
STORAGE
LAV.
KINDERGARTEN
ENTRANCE
CORRIDOR
ENTRANCE
CORRIDOR
1 ST. GRADE
1 ST. GRADE
2 ND. GRADE
2 ND GRADE
6 TH GRADE
6 TH. GRADE
7 TH GRADE
7 TH. GRADE
3 RD GRADE
3 RD. GRADE
4 TH GRADE
4 TH. GRADE
5 TH. GRADE
5 TH GRADE
8 TH GRADE
8 TH GRADE
ART & CRAFTS
MATH · SCIENCE
CORRIDOR
CORRIDOR
PRACTICE
PRACTICE
BOILER ROOM
STORAGE
STORAGE
BOYS LAV.
BOYS LAV.
INSTRUMENTAL MUSIC
WASH AREA
WASH AREA
BOYS LOCKER ROOM
SHOWER
STORAGE
SHOWER
LAV.
LAV.
GIRLS LOCKER ROOM
CHORAL MUSIC
MAIN CORRIDOR
MAIN CORRIDOR
GIRLS LAV.
GIRLS LAV.
JANITOR
JANITOR
MULTI-PURPOSE ROOM
TEACHERS LOUNGE
LAV.
STORAGE
CORRIDOR
PROJECT
PROJECT
BOOK STOR.
LIBRARIAN
MATERIALS CENTER
BUSINESS OFFICE
ENTRANCE CORRIDOR
ENTRANCE CORRIDOR
STOR.
HEALTH
PRINCIPAL
LAV.
GUIDANCE
ADMINISTRATOR

ELEMENTRY LEARNING CENTER

EAST DUBUQUE, ILLINOIS

SQ. FT. = 46,503

SCALE: 3/32" = 1'-0"

STUDY XIV

- BUILDING TYPE STUDIES -

CIRCULAR PLAN (Compact, Open Concept) - 18 CLASSROOM UNIT - DESIGN CAP.530

Total Building Area	46,712 sq. ft.
Building Area per student	78.6 sq. ft.
Construction Cost per sq. ft.	$ 11.00
Construction Cost per student	$ 970.00
Total Construction Cost	$511,800.00

- LIST OF FACILITIES -

- 16 Academic Classrooms @ 950 sq. ft. ea.	15,200 sq. ft.
- 2 Kindergarten Suites @ 1450 sq. ft. ea. Includes lavatories, crafts area and storage	2,900 sq. ft.
- Instructional Materials Center Includes Teachers workroom, librarian's office, Book repair room, four sight and sound rooms	5,200 sq. ft.
- Art and Crafts Lab	1,160 sq. ft.
- Math-Science Combined Lab	1,120 sq. ft.
- Instrumental Music Includes two practice rooms	1,200 sq. ft.
- Choral Music	900 sq. ft.
- Multi-purpose Room	3,240 sq. ft.
- Boy's Locker Room Includes Shower, Lavatory, Storage	780 sq. ft.
- Girl's Locker Room Includes Shower, Lavatory, Storage	780 sq. ft.
- Administrative and Pupil Services Includes Business office, Principal's Office, Health Room, Lavatory, Guidance Office and Administrators office	1,660 sq. ft.
- Miscellaneous Facilities Dual boys and girls lavatories, miscellaneous storage, central wash areas, mechanical equipment, corridors, etc.	
TOTAL USABLE AREA	46,712 sq. ft.

DESIGN COMMENTARY:

Design a school for elementary enrollment (K-6) of at least 500 students (25 per classroom) including all equipment, fees, landscaping, access bridge, air-conditioned and carpeted for a total budget of - $595,000.00. This proposal would be a challange of such proportions to make any designer shudder. Quality could not be sacrificed because of budget limitations yet, the $595,000 figure represented the maximum borrowing capability of the East Dubuque School System.

The site was strictly miserable in the fact that the diameter of the building exceeded more than thirty feet in gradiant. The excavation cost alone exceeded $30,000 and is included in the construction cost. In addition, the total budget included an allowance of $12,000 for a new bridge and $60,000 for moveable equipment.

The choice of the circular geometric shape was decided upon for two reasons - economy and function. The building was to include complete flexibility which meant that load bearing walls had to be eliminated and the open concept appeared to be completely acceptable to the owner. The Board also expressed a serious concern about keeping the maintenance costs at a minimum because of the severe financial limitations of the building. Here then, was the total problem facing the designer.

The multi-purpose room is located in the center of the building for one primary reason - to increase the diameter of the building which will enhance the economical advantages of the circular design. In selecting a circular gymnasium, the designer was able to simplify the structural system and maintain a continued roof slope from the center of the building to the edge of the three foot roof overhang.

The Board recognized the importance of flexibility in design and function and expressed the desire for spacious classrooms to be located in close proximity to the Instructional Materials Center. This gave cause for the center to be located in the present position in an arc covering nearly one-half of the inner core. Separate areas for upper elementary, lower elementary, milling, story-hour, sight and sound rooms, teachers work lab, etc. were provided in a total space of 5,200 square feet. This area represents more than that provided in a multi-purpose room 60' x 80' and definitely places the gymnasium in a role of lesser importance.

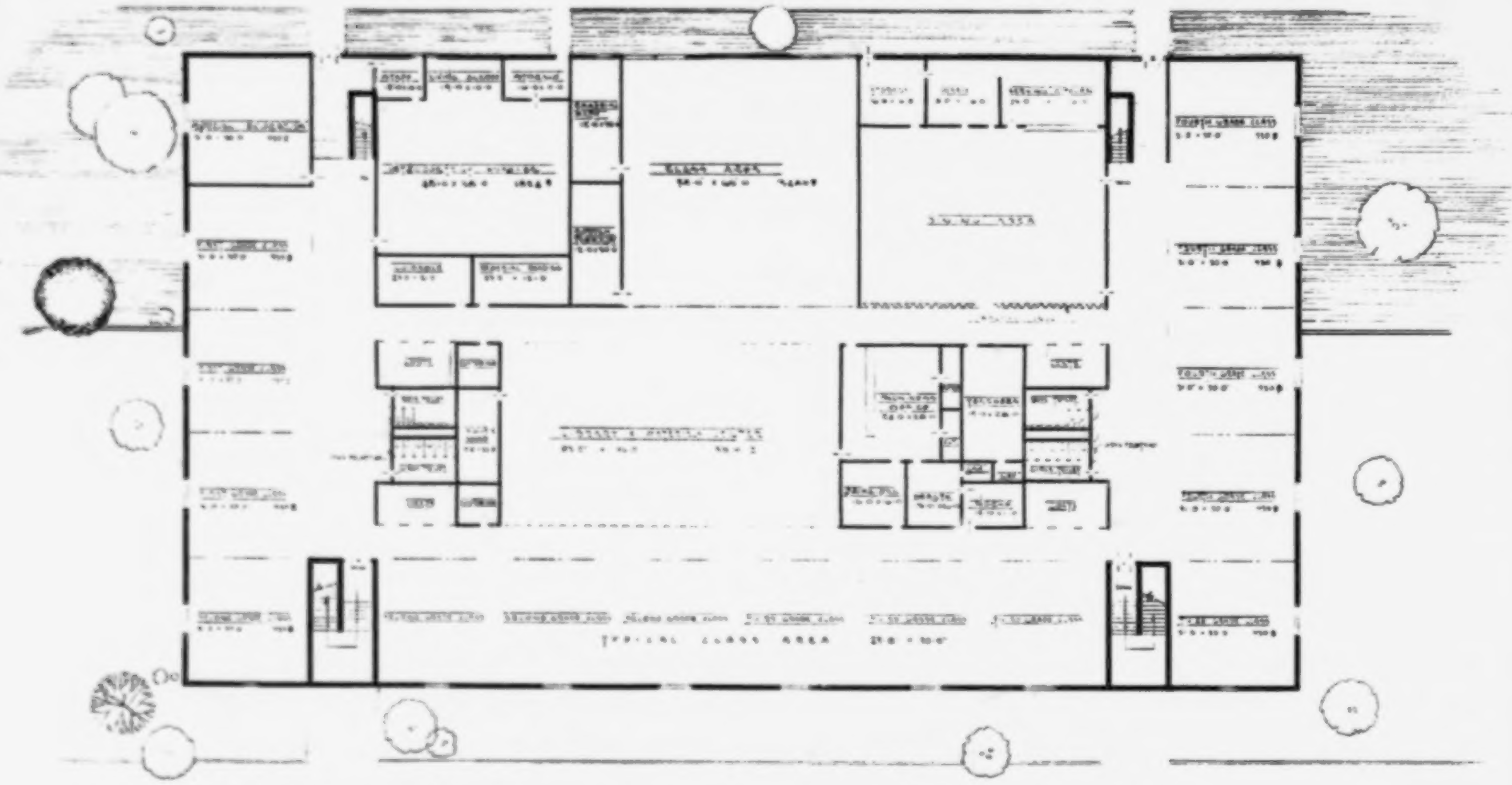
The classrooms are divided into groups of two by removable tack-board walls which are placed between the carpeted floor and ceiling. Each division wall becomes the main teaching wall for apposing classrooms and the secondary divisions between classrooms are formed by moveable room dividers and storage cabinetry all mounted on special casters. The only division screen between the corridor and the class area is a twelve foot panel of chalkboard facing the classarea and tackboard with coat hangers facing the corridor area.

DESIGN COMMENTARY: Continued

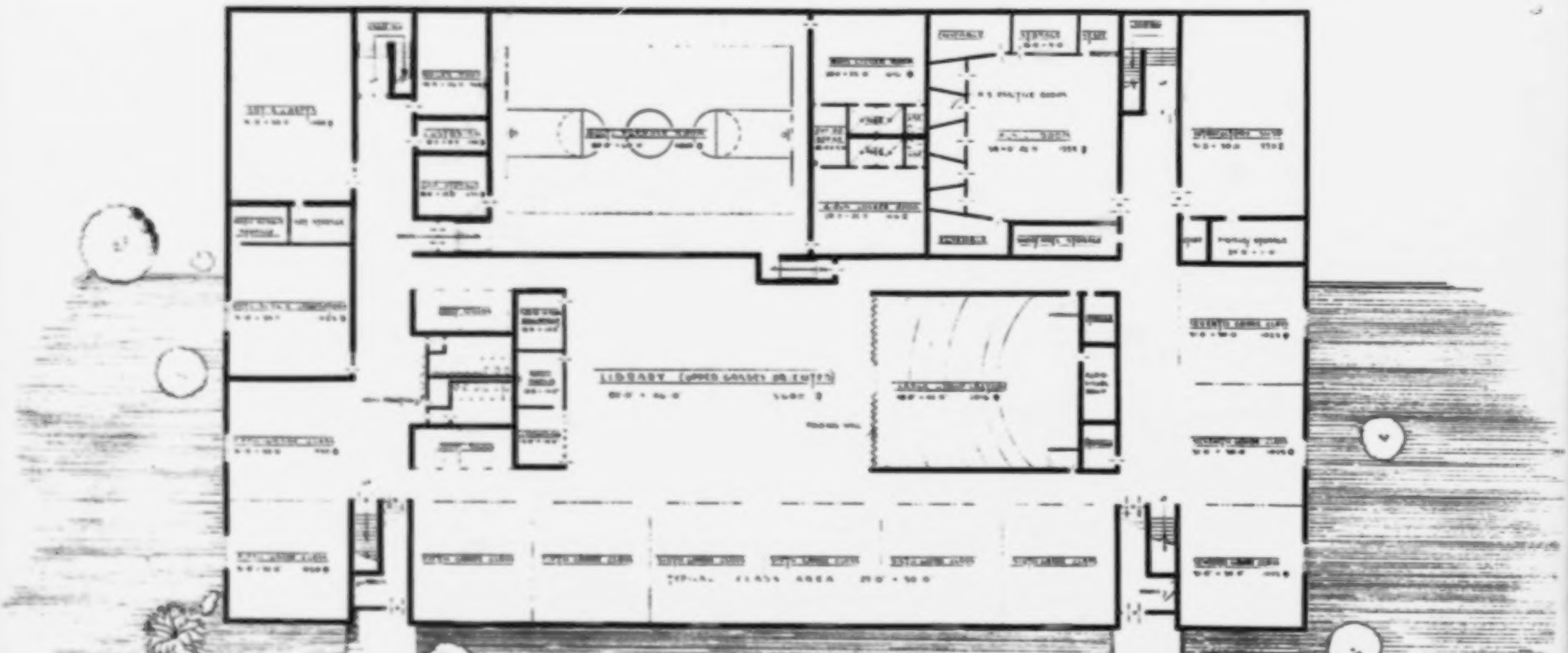
The main entrances are provided with ceramic tile flooring for positive traction and ease of maintenance and all boot stands are located in these areas and not in the carpeted spaces. The building area of 46,712 square feet includes approximately 33,000 square feet of carpeting which is absolutely essential in an open concept school. The sanitary areas have ceramic tile floors and liquid tile walls which provide the ultimate in economy and cleanliness.

One feature not common in the other designs in this publication is the separation of the washing facilities from the actual toilet rooms. Circular type Bradley wash-fountains were placed in recessed open areas directly between the two toilet rooms in each gradiant yet completely open to the corridor. Experience indicates that more "horseplay" occurs around the sinks then at the stools or urinals and it was decided to place the wash-fountains in areas that would be clearly supervised by a single teacher.

In conclusion, this building constructed for a cost of $11.00 per square foot represents high quality throughout. Carpeted floors, recessed lighting, demountable walls, insulated windows, smooth surface roof and a complete air-conditioning system all attest to this fact. This school will compare very favorably with units costing $3.00 to $4.00 more per square foot.


TYPICAL CLASS AREA

UPPER LEVEL FLOOR PLAN SCALE 1/16" = 1'-0"


LIBRARY (UPPER GRADES RES. CENTER)
TYPICAL CLASS AREA

LOWER LEVEL FLOOR PLAN SCALE 1/16" = 1'-0"

PROPOSED NEW ELEMENTARY LEARNING CENTER BOSCOBEL, WISCONSIN

PRELIMINARY STUDY # 3

TOTAL BUILDING AREA 83,776 SQ FT.

STUDY XV

- BUILDING TYPE STUDIES -

BI-LEVEL COMPACT 31 CLASS AREAS DESIGN CAPICITY 765

Total Building Area	83,776 sq.ft.
Building Area per student	109 sq.ft.
Construction Cost per student (Est.)	$1,470.00
Construction Cost per sq. ft.	$ 13.50
Total Construction Cost (Est.)	$1,124,000.00

- LIST OF FACILITIES -

- 30 Academic Class Areas	930 sq.ft.ea.
- Special Education Classroom	930 sq.ft.
- Instructional Materials Center (2 units combined)	7,498 sq.ft.
- Open Class Area	3,480 sq.ft.
- Multipurpose Room	4,800 sq.ft.
- Home Economics Lab Includes staff room, living alcove and storage facilities.	2,305 sq.ft.
- Math Science Lab	1,023 sq.ft.
- Cafeteria	2,640 sq.ft.
- Serving Kitchen Includes dish washing area.	656 sq.ft.
- Introductory Shop Includes staff room, finishing room and storage.	2,100 sq.ft.
- Art & Crafts Lab	1,488 sq.ft.
- Combined Music Includes practice rooms, ensemble (2 rooms), storage and staff room.	2,664 sq.ft.
- Boys Locker Room Includes shower and toilet facilities.	840 sq.ft.
- Girls Locker Room Includes shower and toilet facilities.	840 sq.ft.
- Large Group Lecture	2,016 sq.ft.
- Business Office Includes storage and vault.	840 sq.ft.
- Principal's Office	256 sq.ft.
- Health Suite Includes nurses station.	373 sq.ft.
- Teachers Work Room	420 sq.ft.
- Guidance Room	276 sq.ft.
- Miscellaneous Facilities: Sanitary rooms, stairs, corridors, coat areas, building storage, etc.	
TOTAL BUILDING AREA	83,776 sq.ft.

DESIGN COMMENTARY:

The site selected by the Board of Education and approved by the electors in Boscobel provided approximately 14 acres of sloping land which allowed the most advantageous use of a bi-level design. The building is designed to be accessible from grade level at both floor elevations, thus providing maximum ease of entry and exit from each floor. The selection of a very simple design with two floor levels had an obvious appeal with the electors, despite the fact that the multi-level structure has not proven to be more economical than the single story school.

Two major challenges were posed by the Board of Education:

- Provide a building with the maximum flexibility but conventional in appearance.
- Maintain a maximum budget not to accede $1,375,000 including furnishings, fees, etc.

In approaching the design problem, here again it was decided that the Instructional Materials Center-Library should be centrally located in the academic core. Since the building planned is a bi-level type structure, two choices were apparent. Either one materials center would be provided to serve the entire school or-an Instructional Materials Center would be provided on each floor level. Because of the need for direct accessibility to the Instructional Materials Center-Library, it was decided that a facility should be centered on each floor to serve the surrounding classroom on that particular level.

The enrollment pattern proposed for this school included grades one through seven, and the bi-level design afforded the district with an excellent opportunity to separate the upper and lower grades through the use of the floor as a horizontal separation. Grades five through seven are located on the lower floor level immediately accessible to the art-crafts lab, introductory shop, multipurpose room, music lab, and locker and shower facilities normally used to a greater extent by the upper grades. In addition, the multi-media lecture area and Instructional Materials Center is centrally located for the upper grade level.

The grade levels to be housed in the upper level include grades one thru four, and the kindergarten children will be housed in a separate building previously used as the high school annex. Those grades will have their own materials center as well as immediate access to the dining area and administrative-pupil services department. The Home Economics lab probably would have been better suited to the lower floor location if space had been available. However, we do gain an advantage in that the educable-trainable children will have direct access to the home economics sewing and food preparation equipment. These children will also take full advantage of the art lab and introductory shop facilities.

DESIGN COMMENTARY: (Continued)

Following the trend which is becoming more prevalent throughout the Nation; the lavatories for wash purposes have been removed from the toilet rooms and placed in the direct view of the supervising teacher. Little "horse play" occurs in the area of the stools and urinals however, children relish playing in sinks and with paper towel dispensers. It is difficult for a teacher standing in the corridor to control children behind closed doors in two separate rooms. It is felt that the wash units outside will allow better discipline and those wash fountains can be used by the adjacent classrooms if necessary.

The administrative-pupil services area has been located in the heart of the building directly adjacent to the materials center at the request of the faculty. It has become increasingly apparent that these facilities should be located at the hub of pupil activity rather than immediately next to the main entrance, as is so often the case. In the open concept plan, even the secretaries and non-teaching staff become engrossed in the program and they take greater initiatives if they can become a part of the every day function of the building. Although personalities differ, very few administrative staff members are so strongly in favor of outside windows, largely because of the broad use of air conditioning and better ventilation and air distribution methods.

It is interesting to notice that the gymnasium/all purpose room is depressed approximately five feet to allow a minimum ceiling height of 14 feet which has been proven to be adequate for elementary school purposes. By doing this, we were able to gain an additional area on the upper level equivalent to at least four classrooms. Otherwise the area above would have been an expensive void space providing a ceiling height out of proportion for the intended function of the facility. This theory was well received by the faculty and electors because additional gymnasium facilities nearly always draw criticism from the taxpayers.

In todays market, a construction budget of $13.50 per sq. ft. becomes a challenge to any designer, particularly with severe inflationary trends in the construction industry. Obviously construction methods must change and materials substituted to avoid the premium payed for highly skilled labor. The open concept design allowing the elimination of classroom doors, hardware, division walls, painting, individual room thermostats, light switches, etc., definitely results in a substantial savings in cost. The savings can be computed in rough form as follows:

- Deletion of thermostats in each room ..	$800 per unit
- Deletion of varnished door, frame and hardware	$260 per door
- Deletion of two 6" masonry walls, painted	$1,400.00
- Deletion of light switch (optional)....	$ 40.00

MINIMUM TOTAL DEDUCTION PER ROOM - $2,500.00

DESIGN COMMENTARY: (Continued)

It is also apparent that the labor involved in the installation of lighting, carpeting, floor base, and acoustical ceilings will be less expensive if walls are eliminated. If $2,500.00 is saved in each classroom space, this savings will allow the district to equip the entire building in a most functional and complete manner.

If we recognize the need for reducing the cost of school building construction without sacrificing quality and function, and if we realize that we are faced with an inflationary trend driving costs ever upward, - then - we must also realize that our construction methods and choice of materials must change accordingly. We can no longer build schools as they have been built during the past thirty years without paying the price.

The Boscobel School will represent a departure from the standard brick and block construction which has become increasingly expensive because of the high labor rate. The walls will be of decorative precast concrete manufactured under plant conditions and erected from the footing to the roof in one section approximately 28 ft. to 30 ft. in length. The inside of the wall exposed to the class areas will be insulated with Dyfoam or some other rigid insulation applied directly to the concrete wall. The rigid insulation will be covered from floor to ceiling with a tack surface divided every four feet with aluminum receiver tracks running from floor to ceiling. These receiver tracks may be adaptable for shelving, map rails, chalkboard, hoop and loop panels, flannel board, projection screens, etc. and thus the entire perimeter wall will become a teaching surface.

In summary, the Boscobel plan exploits the advantages of the open concept flexibility in what is otherwise a very conventional building on two levels. We can fully utilize modern teaching methods but we do not risk losing the support of the voters because of a "way-out" type design. There will no doubt be weaknesses in this building yet, what building built for school purposes can ever be classified as the perfect solution? What may work well in Boscobel may not be the answer elsewhere.

- SECONDARY LEARNING CENTERS -

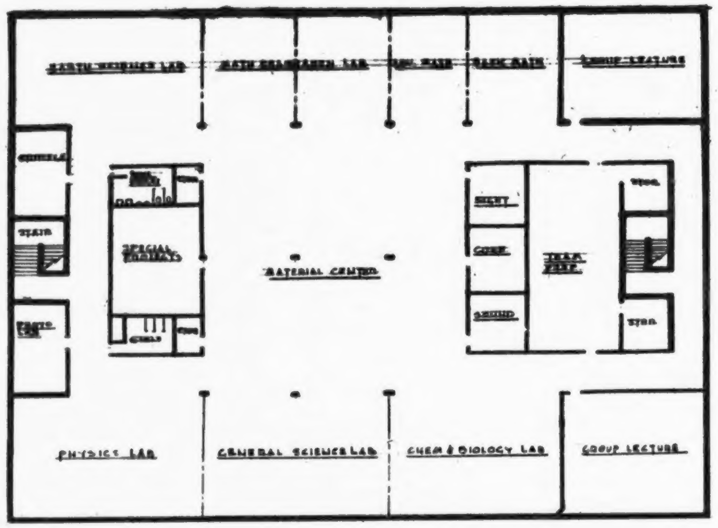
INTRODUCTION.......

The preceding section indicated a rather sharp departure from the self-contained, rectilinear, closed classroom design concept. If more freedom of movement of the students is recommended for the elementary level -- this freedom of movement becomes even more essential in the secondary school.

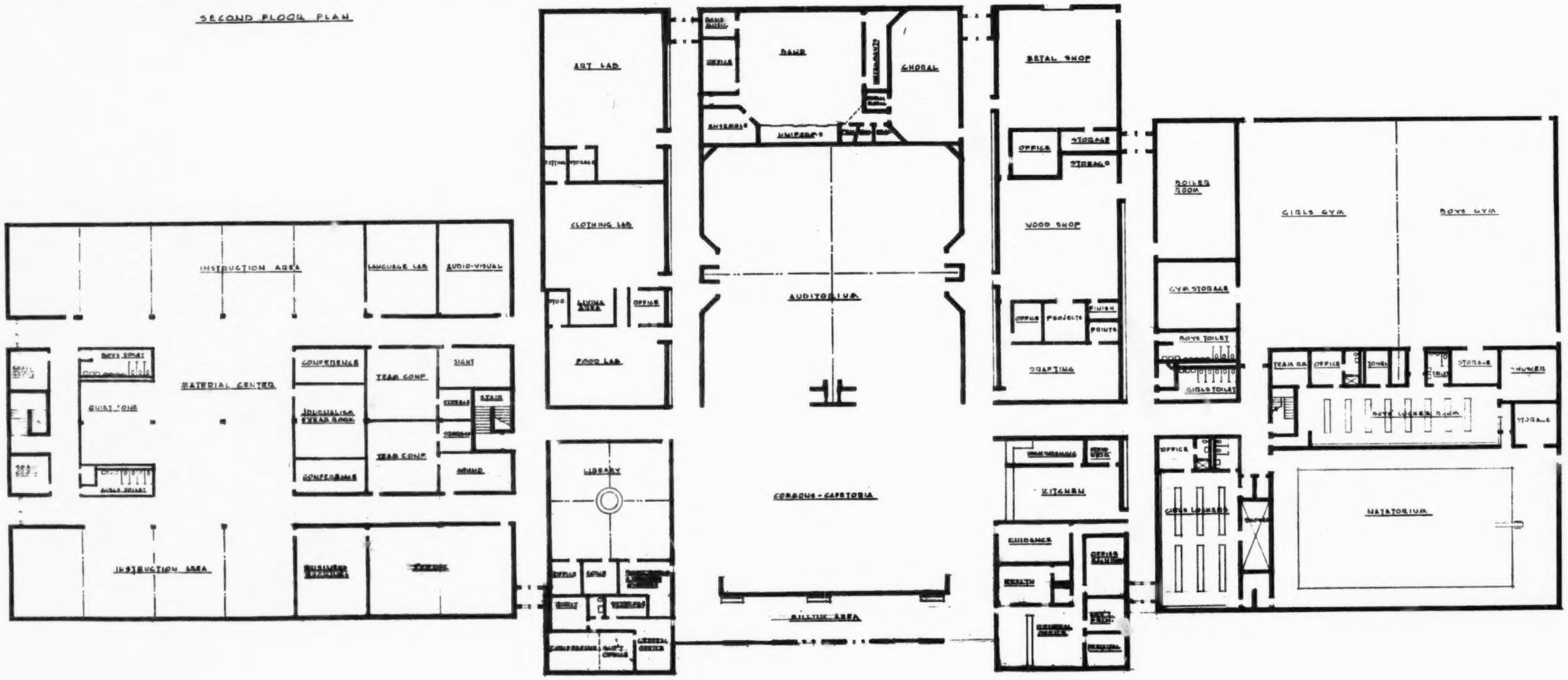
> In this section, the emphasis is placed on the changes which are occurring in the design of secondary learning centers. As the educational demands of the individual student changes so must the educational specification. As the educational specification changes, we would most assuredly expect a change in the basic design pattern of the physical plant. The secondary school plan is no longer a stereo-typed master which can be transplanted from district to district without consideration of the needs of the individual district. Each district has individual objectives and these objectives must be satisfied with an individual plan designed specifically for that district.

It is the purpose of this section to illustrate a number of design solutions tailored to the different educational programs which may be encountered. They cannot be misconstrued as stock plans but rather - they indicate the current trend toward the quest for freedom of movement of the individual student. Open concept flexibility is the basic objective in modern education as we know it today. The design solutions which follow represent a number of thought provoking studies to meet this objective.

> All school construction costs represent actual costs or estimates which have valid projections to June 1969. Following that date, the cost data will require up-dating in direct proportion to the rise in construction costs.


GROUP LECTURE
STAIR
PHOTO LAB
SPECIAL PROJECTS
MATERIAL CENTER
SIGHT
COMP
SOUND
TEAM PREP
STOR
STOR
PHYSICS LAB
GENERAL SCIENCE LAB
CHEM & BIOLOGY LAB
GROUP LECTURE

SECOND FLOOR PLAN


INSTRUCTION AREA
LANGUAGE LAB
AUDIO-VISUAL
BOYS TOILET
MATERIAL CENTER
QUIET ZONE
GIRLS TOILET
CONFERENCE
JOURNALISM YEAR BOOK
CONFERENCE
TEAM CONF
TEAM CONF
SIGHT
STAIR
SOUND
INSTRUCTION AREA
ART LAB
CLOTHING LAB
LIVING AREA
OFFICE
FOOD LAB
LIBRARY
BAND
OFFICE
ENSEMBLE
UNIFORMS
CHORAL
AUDITORIUM
COMMONS - CAFETORIA
METAL SHOP
OFFICE
STORAGE
STORAGE
WOOD SHOP
OFFICE
PROJECTS
FINISH
PAINTS
DRAFTING
KITCHEN
GUIDANCE
HEALTH
GENERAL OFFICE
CONFERENCE
SUPT'S OFFICE
GENERAL OFFICE
BOILER ROOM
GYM STORAGE
BOYS TOILET
GIRLS TOILET
GIRLS GYM
BOYS GYM
TEAM RM
OFFICE
TOWEL
STORAGE
SHOWER
BOYS LOCKER ROOM
STORAGE
OFFICE
GIRLS LOCKERS
NATATORIUM

FIRST FLOOR PLAN

STUDY I

- BUILDING TYPE STUDIES _

TWO STORY - RECTILINEAR COMPACT - 39 TEACHING STATIONS - DESIGN CAP. 975

Total Building Area	123,900 sq. ft.
Building Area per student	127 sq. ft.
Construction Cost per sq. ft.	$ 15.40
Construction Cost per student	$ 1,960.00
Total Construction Cost	$1,910,000.00

- LIST OF FACILITIES -

FIRST FLOOR FACILITIES:

- 9 Academic Class Areas	768 sq. ft. ea.
- Language Laboratory	800 sq. ft.
- Audio-Visual Laboratory	820 sq. ft.
- Business Machines	820 sq. ft.
- Typing	1,600 sq. ft.
- Materials Center Including Quiet Zone.	3,380 sq. ft.
- Art Laboratory Includes Storage Area.	2,520 sq. ft.
- Clothing Lab Includes office and living area.	1,600 sq. ft.
- Food Lab	1,176 sq. ft.
- Library Includes office, conference, book repair, etc.	2,764 sq. ft.
- Instrumental Music Includes music storage, office, ensemble, three practice rooms, uniform storage and instrument storage.	2,700 sq. ft.
- Choral Music	1,100 sq. ft.
- Multi-use Auditorium Divisible into four lecture areas.	8,460 sq. ft.
- Commons - Cafeteria ... Capacity 450	7,200 sq. ft.
- Metal Shop	1,764 sq. ft.
- Wood Shop Includes storage, offices, finishing, project storage, etc.	3,200 sq. ft.
- Drafting Room	840 sq. ft.
- Kitchen	1,440 sq. ft.

LIST OF FACILITIES - Continued

- Office Area Business, Guidance, Health, Principal, Assistant Principal.	2,200 sq. ft.
- Gymnasium	9,000 sq. ft.
- Swimming Pool	6,000 sq. ft.
- Boys Varsity Locker Rooms Includes office, team room, towel storage, shower, etc.	3,600 sq. ft.
- Girls Locker Room Includes office, shower, lavatory, etc.	2,520 sq. ft.

SECOND FLOOR FACILITIES:

- 4 Mathematics Research and Classrooms	720 sq. ft. ea.
- Earth Science Laboratory	1,500 sq. ft.
- 2 Group Lecture Areas	1,140 sq. ft. ea.
- Physics Lab	1,660 sq. ft.
- General Science Lab	1,800 sq. ft.
- Chemistry and Biology Lab	1,500 sq. ft.
- Materials Center Includes sight, sound, conference, team, and special projects.	7,100 sq. ft.
- Miscellaneous Facilities: Corridors, Mechanical Equipment, Stairways, Lavatories, Storage, etc.	
TOTAL USABLE AREA	123,900 sq. ft.

DESIGN COMMENTARY:

The two-story plan presented represents a maximum effort to involve the open concept in a conventional, rectilinear form. It is impossible to open the building as much as would be readily done with a single story structure for the following reason. In the single story plan, the roof load design factor is 30 pounds per sq. ft. whereas, in the two story structure the floor loading of the second floor is 80-100 pounds per sq. ft. The obvious result is the reduction in economical long spans possible with the two story unit. These long spans (maximum distance between supports) are absolutely essential in an open concept structure.

Another major point of difference becomes apparent in the space utilization picture. The two story plan requires more corridor area and additional space is required for the multiple stairways to comply with the code. Roof areas are reduced, but in many instances, a flat roof is associated with a two story building. Many single story schools have pitched roofs to the exterior, which allow natural drainage and less chance of leakage.

DESIGN COMMENTARY - Continued

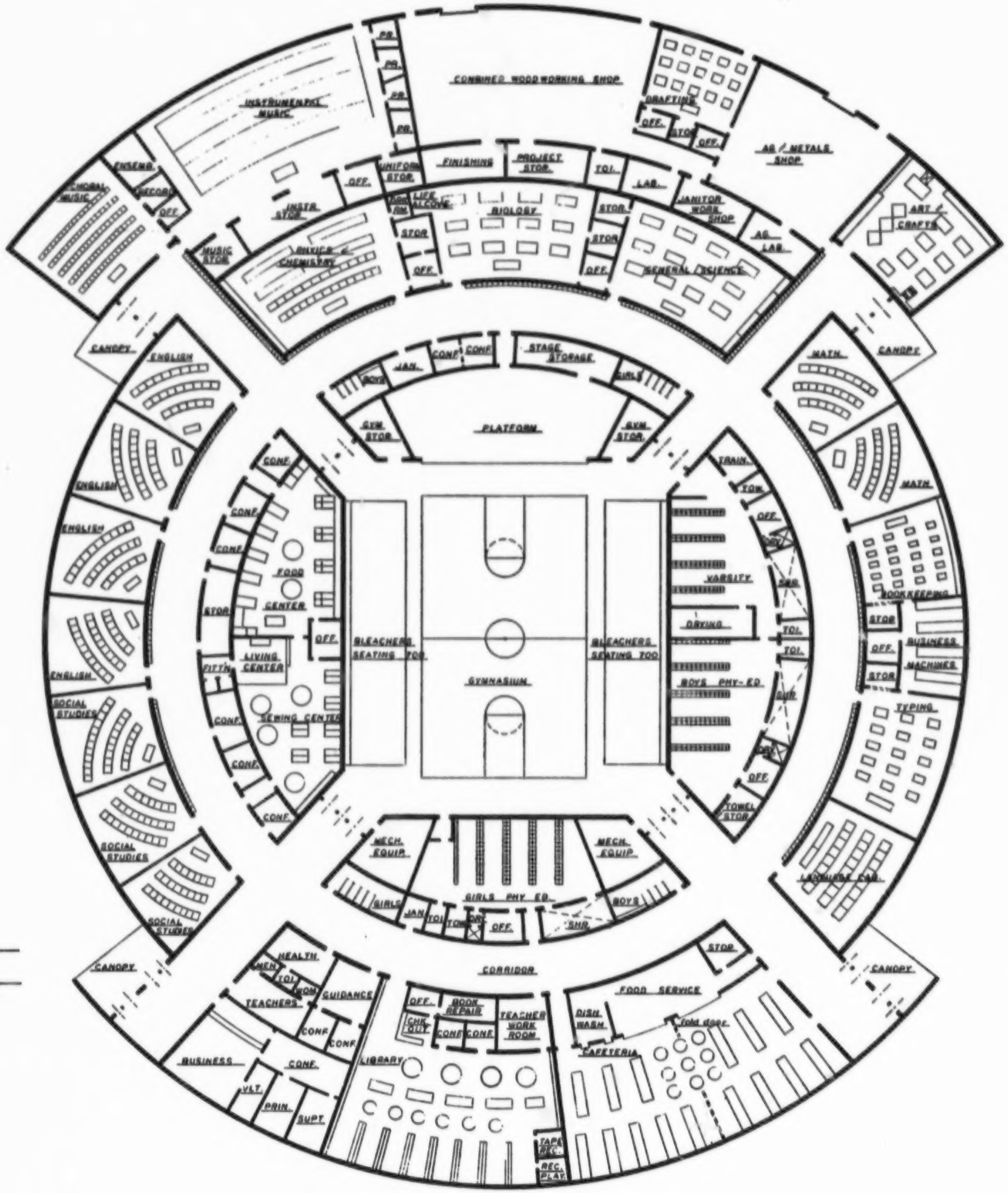
The fact that this plan includes a swimming pool lends strength to the educational program. The large divisible lecture area in combination with the commons - cafeteria indicates versatility and multi-use. The two story academic section satisfies many of the requirements of the open space concept and most class and laboratory space allocations are adequate. The orientation of these facilities with respect to the instructional materials centers, is not ideal but will function with coordinated scheduling.

The fact that we do have a conventional two story plan will indicate that we will also have intersecting corridors and stairways. These features will slow the flow of traffic and restrict movement at the point of congestion. These problems are not as severe in the single story unit.

Definite areas of weakness are found in the specialized labs such as the art, music, shops, drafting and home economics because of serious space limitations. These areas can be expanded with no particular problem, but the budget would have to be increased accordingly. In the program prepared by the Board of Education, the emphasis was placed on the academic areas, and the laboratories become secondary in importance. In most districts with the increased attention to vocational training, the opposite would be true.

In many districts, the swimming pool facility is gaining wide acceptance. A facility similar to the one shown will add approximately $225,000.00 to $300,000.00 to the total cost of the school. A most important factor concerning this cost is the location of the pool, because economics are realized if the locker and shower facilities can be designed to serve both the gymnasium and the pool. The shower areas are expensive and multi-use is recommended.

In conclusion, this plan is not uncommon except for the fact that we have removed a number of walls and introduced the open concept. Special attention should be directed to areas of weakness heretofore mentioned. The program must dictate the function.


CHORAL MUSIC
ENSEMB.
RECORD
OFF.
INSTRUMENTAL MUSIC
PR.
PR.
PR.
PR.
COMBINED WOODWORKING SHOP
DRAFTING
OFF.
STOR.
OFF.
AG / METALS SHOP
ART / CRAFTS
OFF.
UNIFORM STOR.
FINISHING
PROJECT STOR.
TOI.
LAB.
JANITOR WORK SHOP
AG. LAB.
INSTR. STOR.
MUSIC STOR.
PHYSICS & CHEMISTRY
LIFE ALCOVE
BIOLOGY
STOR.
STOR.
OFF.
STOR.
STOR.
OFF.
GENERAL SCIENCE
CANOPY
ENGLISH
CANOPY
MATH
BOYS
JAN.
CONF.
CONF.
STAGE STORAGE
GIRLS
GYM STOR.
PLATFORM
GYM STOR.
MATH
TRAIN.
TOW.
OFF.
CONF.
CONF.
CONF.
ENGLISH
ENGLISH
FOOD CENTER
STOR.
OFF.
BLEACHERS SEATING 700
GYMNASIUM
BLEACHERS SEATING 700
VARSITY
DRYING
BOYS PHY. ED.
BOOKKEEPING
STOR.
BUSINESS MACHINES
OFF.
STOR.
TOI.
TOI.
ENGLISH
FITTG.
LIVING CENTER
SOCIAL STUDIES
CONF.
SEWING CENTER
CONF.
CONF.
TYPING
OFF.
TOWEL STOR.
MECH. EQUIP.
MECH. EQUIP.
SOCIAL STUDIES
GIRLS
JAN.
TOI.
TOW.
DR.
OFF.
GIRLS PHY. ED.
BOYS
SHR.
LANGUAGE LAB.
SOCIAL STUDIES
CANOPY
HEALTH
MEN
TOI.
WOM.
GUIDANCE
TEACHERS
CONF.
CONF.
BUSINESS
CONF.
VLT.
PRIN.
SUPT.
CORRIDOR
OFF.
BOOK REPAIR
CHK. OUT
CONF.
CONF.
TEACHER WORK ROOM
LIBRARY
TAPE REC.
REC. PLAY.
STOR.
FOOD SERVICE
DISH WASH
CAFETERIA
fold door
CANOPY

PRELIMINARY

FLOOR PLAN

SCALE 1/16" = 1'-0"

TOTAL AREA 82,700 SQ. FT.

STUDY II

- BUILDING TYPE STUDIES -

CIRCULAR PLAN   COMPACT   HIGH SCHOOL   29 STATIONS   DESIGN CAP. 600

Total Building Area	82,700 Sq. Ft.
Building Area per Student	138 Sq. Ft.
Construction Cost per Sq. Ft.	9.24
Construction Cost per Student	$ 1,385.00
Total Construction Cost	$ 761,800.00

- LIST OF FACILITIES -

- Cafetorium .....(Cap. 210)	32' x 88'
- Kitchen Includes Dishwashing Room, Food Storage Room	24' x 70'
- Library Suite Includes Office, Checkout Area, Book Repair Room, Conference Room, Teachers Material Center	60' x 56'
- Office Suite Includes Business Office, Board Room, Principals Office, Superintendents Office, Vault, Health Room, Guidance Center, Toilets	40' x 56'
- Academic Classrooms:	
- 2 Social Studies	30' x 30'
- 1 Language Lab	30' x 32'
- 3 English	30' x 30'
- 2 Mathematics	25' x 30'
- 1 Multi-Use	30' x 32'
- Combined Shop Suite:	
- General Shop	84' x 38'
- Projects Storage	12' x 26'
- Finishing	12' x 18'
- Testing Lab	12' x 14'
- Office	12' x 12'
- Drafting Classroom	26' x 38'
- Mezzanine Storage	12' x 70'
- Commercial Suite:	
- 1 Commercial Room	30' x 34'
- 1 Bookkeeping Room	32' x 30'
- 1 Business Machines	38' x 30'

LIST OF FACILITIES - Continued

- Home Economics Suite Includes Fitting Room, Sewing Center, Living Center, Food Preparation Center, Office, Conference Room	100' x 32'
- Science Suite Includes Physics & Chemistry Lab, Biology Lab, Storage (2 units), Preparation Room, Life Alcove	120' x 30'
- Music Department (Instrumental) Includes Storage Room, 6 Practice Rooms, Office, Ensemble Room, Instrument Storage	72' x 48'
- Choral Music Suite Includes Uniform & Robe Storage, Recording Room	30' x 48'
- Girls Locker Room:	
Locker Room	28' x 46'
Storage Room	8' x 10'
Toilet, Shower	20' x 10'
Office	10' x 12'
- Boys Locker Room:	
Varsity Team Room	44' x 30'
Coaches Office	10' x 18'
Training Room	10' x 12'
Toilet Facilities	
Drying Room	10' x 24'
Showers	10' x 24'
Phy. Ed. Storage	10' x 14'
Towel Room	10' x 8'
Phy. Ed. Office	10' x 12'
Boys Phy. Ed. Locker Room	64' x 30'
- Stage	66' x 30'
Two Dressing Rooms	10' x 14'
- Gymnasium (Main Floor Seating, 1400)	108' x 90'
Gym Storage Room	22' x 26'
- Miscellaneous Facilities:	
Teachers Lounge (Dual Toilets w/Storage)	20' x 20'
4 Conference Rooms	12' x 10'
Dual Storage Rooms	10' x 26'
4 Main Toilets	10' x 24'
2 Mechanical Equipment Rooms	
Janitors Closets	

DESIGN COMMENTARY -

Budget Problems! How often we encounter this problem when asked to design a building for 500 students on a budget barely suitable for 350 children. This describes the exact situation we encountered in the design of the high school building under discussion. The Board of Education established a maximum bond issue of $900,000.00 which had to include the building, design fees, and the thought of equipment was set aside with no definite plan to arrange for the purchase of said equipment. We all know that the equipment for the High School Building does not represent a small expenditure.

Now we have a problem! We knew that the building had to include adequate facilities, particularly in the central core to have at least the current enrollment of 360. We also faced the growth factor of the district and it appeared that the building should be designed for 450 with a central core to handle 550. The second decision involved the size of structure required. If we designed a facility for the average cost of $13.40 per square foot, we would be providing a building area of 60,000 square feet.

We have seen buildings under-designed in the past and we have observed the reactions of the taxpayers when they were advised that their building was obsolete after several years use. The district in which we were involved would be particularly displeased at this thought. It was apparent that no matter what we would do with a rectangular unit, the cost factor would be little less than $11.00 or $12.00 per square foot with high maintenance type finishes.

In recognition of the success we had experienced with the cost of the *circular elementary schools, it was decided to again turn to the* circle for the answer. We were uncertain of the costs involved, and the bidding time was poor, so we designed the building for $10.50 per square foot and encompassed an area of nearly 83,000 square feet. We had some sleepless nights prior to that bid opening, and we knew that if we did not meet the budget --- we could look for another project to design, but not with that School Board. The result of the Bidding ???? ------ Total Construction Cost $761,000.00 /// Cost Per Square Foot $9.20 /// $80,000.00 left over for equipment .... all competent contractors, and close bidding.

The net result has been a simple building without frills, but with terrazzo floors, ceramic tile walls in the corridors, full ceramic in the toilets, thermopane windows, acoustical tile ceilings, wood gymnasium floor, partial air conditioning and --- adequate space!!! The gymnasium, locker rooms, home economics suite and other areas within the central core, were designed to forestall obsolescence for many years to come. We may have to add academic classrooms which will not represent insurmountable costs to the district at some future date.

After all of the problems with the tight budget, The Board of Education did not economize on the equipment. The folding doors, science equipment, commercial and home economics equipment is of the highest quality, and the most modern design. We have academic classroom separations provided by moveable walls and all areas have a feeling of spacious environment. The building was not under-designed and the quality is comparable to those schools built for the $13.40 average.

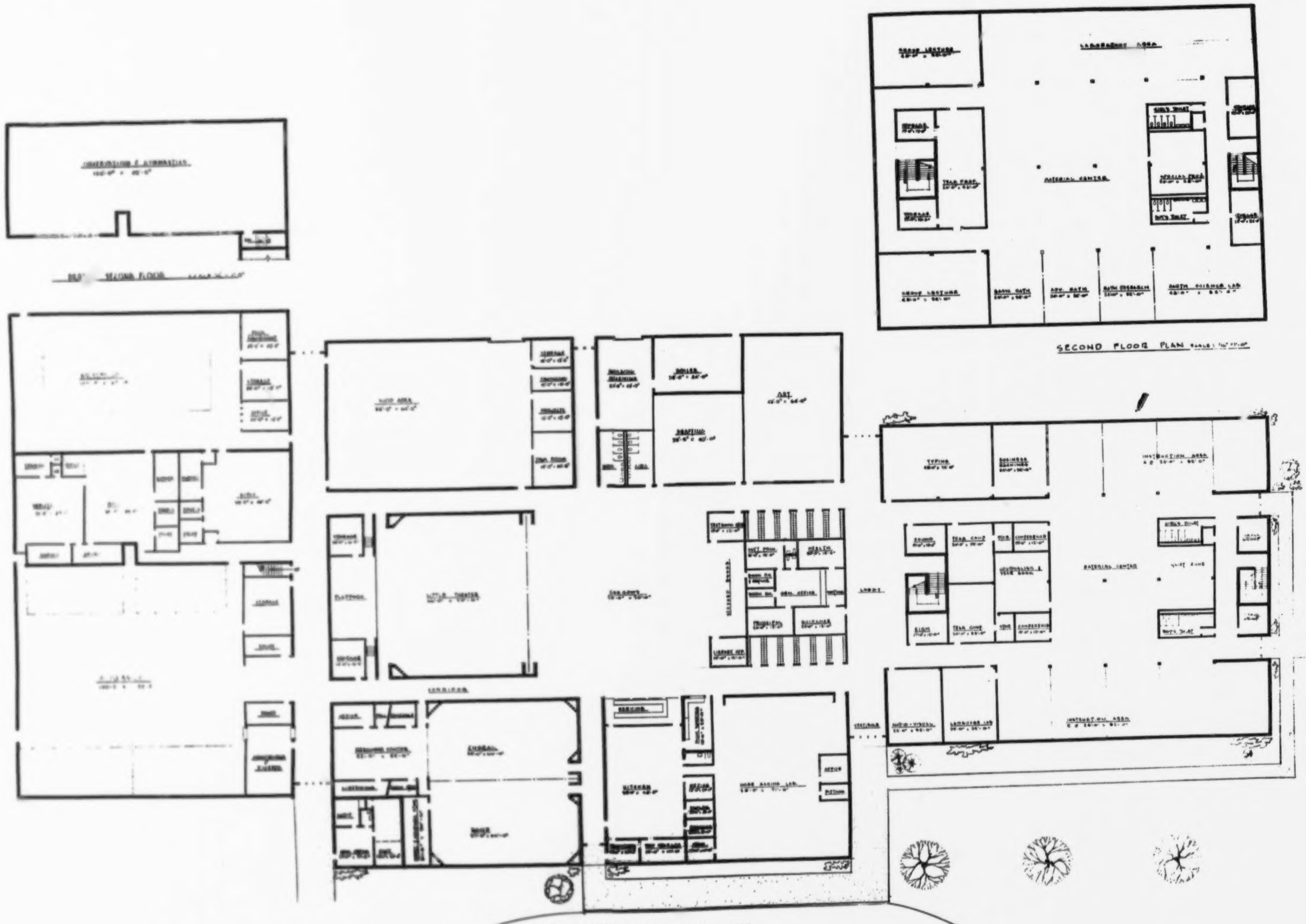
DESIGN COMMENTARY - Continued

The exterior, of contrasting brick colors, is not outstanding, and will not win a prize, but the mere fact that the building is circular, makes it interesting and it does draw attention. We were concerned about the acceptance of the public to the circular building, but no longer, because they want to get their dollar value, and in this building, they got it.

We have been questioned about placing equipment units against curved walls, and the extra expense involved, but, we had no problem because the curvature was so slight and there was no additional expense. The fact that we had adequate space was more beneficial and we were not forced to "squeeze" the equipment into place.

What would we have added to the building if the budget would have permitted a larger expenditure? Probably a "little theatre"; slightly larger and more complete materials center, increased science facilities for individual research, a mezzanine area for physical education, and gymnastics and a swimming pool, --- all in that order. The Administrator may have some other ideas, but he is pleased with the building as it now stands, and he is aware of the conservative community in which he lives.

This building has created a large amount of interest throughout the state and we have heard very favorable comments from all who have toured the building. The fact remains that we have a substantial and functional building with an area of 83,000 square feet for a construction cost of $761,000.00, including all trades.


GROUP LECTURE
LABORATORY AREA
MATERIAL CENTER
TEAM CONF.
STORAGE
GIRLS TOILET
SPECIAL PROJ.
BOYS TOILET
BASIC MATH
ADV. MATH
MATH RESEARCH
EARTH SCIENCE LAB
SECOND FLOOR
AUTO AREA
STORAGE
BOILER
DRAFTING
ART
PLATFORM
LITTLE THEATER
HEALTH
GEN. OFFICE
PRINCIPAL
GUIDANCE
LIBRARY
CORRIDOR
LOBBY
KITCHEN
HOME MAKING LAB
CHORAL
BAND
TYPING
BUSINESS MACHINES
INSTRUCTION AREA
SOUND
TEAM CONF.
CONFERENCE
COUNSELING & TEST ROOM
MATERIAL CENTER
QUIET ZONE
GIRLS TOILET
BOYS TOILET
VESTIBULE
AUDIO-VISUAL
LANGUAGE LAB
INSTRUCTIONAL AREA

SECOND FLOOR PLAN SCALE: 1/16" = 1'-0"

FIRST FLOOR PLAN SCALE [illegible]

[illegible] 12,132 SQ. FT.

STUDY III

- BUILDING TYPE STUDIES -

TWO STORY - RECTILINEAR COMPACT - 37 TEACHING STATIONS - DESIGN CAP. 925

Total Building Area	137,270 sq. ft.
Building Area per student	148 sq. ft.
Construction Cost per sq. ft.	$ 14.80
Construction Cost per student	$ 2,200.00
Total Construction Cost (Estimated)	$2,025,000.00

- LIST OF FACILITIES -

FIRST FLOOR FACILITIES

- 9 Academic Classrooms	768 sq. ft. ea.
- Typing Classroom	1,536 sq. ft.
- Business Machines Lab	768 sq. ft.
- Audio-Visual Lab	768 sq. ft.
- Language Lab	768 sq. ft.
- 2 Team Work Rooms	500 sq. ft. ea.
- 2 Small Group Instruction	169 sq. ft. ea.
- Instructional Materials Center .... Includes sight room, sound room, quiet zone and conference rooms.	3,800 sq. ft.
- Journalism Work Room	620 sq. ft.
- Main Office & Student Services .... Includes assistant principals office, health room, general office, principal, business, guidance, work room, and lavatories.	3,000 sq. ft.
- Home Making Laboratory .... Includes storage, office and fitting room.	4,176 sq. ft.
- Kitchen and Food Service .... Includes serving area, dishwash facility, lavatory, office, cooler, freezer, receiving and dry food storage.	3,450 sq. ft.
- Music Department .... Includes instrumental music, choral music, resource center, office, practice, ensemble, listening, music storage, instrument storage and portable practice rooms.	6,800 sq. ft.
- District Administrators Office .... Includes auditors office, superintendents office, lavatory and conference room.	960 sq. ft.

LIST OF FACILITIES - Continued

- Little Theater ...... Capacity 220 .... 6,340 sq. ft.
  Includes storage and platform.
- Commons-Cafeteria .... 7,100 sq. ft.
  Includes text book storage and library office.
- General Combined Shop Area .... 6,900 sq. ft.
  Includes storage, finishing, projects, team room and mezzanine storage.
- Drafting & Design Classroom .... 1,520 sq. ft.
- Arts & Crafts Lab .... 2,690 sq. ft.
- Natatorium (Swimming Pool) .... 7,200 sq. ft.
  Includes pool equipment room, storage and office.
- Boys Varsity Locker Rooms .... 3,700 sq. ft.
  Includes training, varsity, boys phy ed, office, shower, drying area, P.E. shower, towels and lavatory.
- Girls Locker Room .... 2,500 sq. ft.
  Includes shower, towel room and lavatory.
- Gymnasium .... 12,240 sq. ft.
  Includes concession & tickets, dual public toilets and gym storage.

SECOND FLOOR FACILITIES:

- Gymnastics & Spectator Mezzanine ...... 5,760 sq. ft.
- 3 Mathematics Classrooms .... 768 sq. ft. ea.
- 2 Large Group Lecture Areas .... 1,536 sq. ft. ea.
- Earth Science Lab .... 1,536 sq. ft.
- Combined Science Lab .... 3,840 sq. ft.
- Team Preparation Work Room .... 1,020 sq. ft.
- Materials Center .... 3,744 sq. ft.
- Special Project Room .... 672 sq. ft.
- Miscellaneous Facilities:
  Student Locker Areas, Boiler Room, Miscellaneous Storage, Corridors, Janitors Room, Stairwells, Lobbies, Lavatories, etc.

TOTAL USABLE AREA .... 137,270 sq. ft.

DESIGN COMMENTARY:

Simplicity of lines, rectilinear shape and combination single and two-story configuration describe the plan under consideration. The building represents a modified open concept approach with maximum allowable clear span areas. As with every building design, there are definite areas of strength and others that can be improved with an increase in the total building area -- and the budget.

Valuable space is given to corridors, stairwells, mechanic runs, etc. which do not reflect in the square foot cost, but definitely become a factor in the total cost picture. These areas are unavoidable in a multi-story plan, even though special effort is taken to reduce the total amount of non-academic space. The two story plan also increases the cost because of the duplication of sanitary areas for each floor, whereas this duplication might be eliminated with the single story structure.

Once again, we have included a complete swimming pool facility located directly next to the locker and shower areas which will also serve the gymnasium. Because of the orientation of the gymnasium and swimming pool, we were able to include a mezzanine area above the locker room areas to serve a number of useful purposes. This area will be equipped with movable bleachers to increase the capacity of gymnasium seating and can be rotated to provide similar service to the pool. The mezzanine will also serve as a fourth physical education facility for wrestling, gymnastics, and light physical activities. The locker room orientation can be improved with a re-alignment of the auxillary rooms, but adequate space has been provided.

It was the intention to design an open shop area in which to house a full program of industrial arts activities. Because of the rapid changes in this field, we were concerned about restricting this area with unnecessary and restrictive walls. We would have preferred an area of at least 12,000 sq. ft. but again, the budget would not allow this increase.

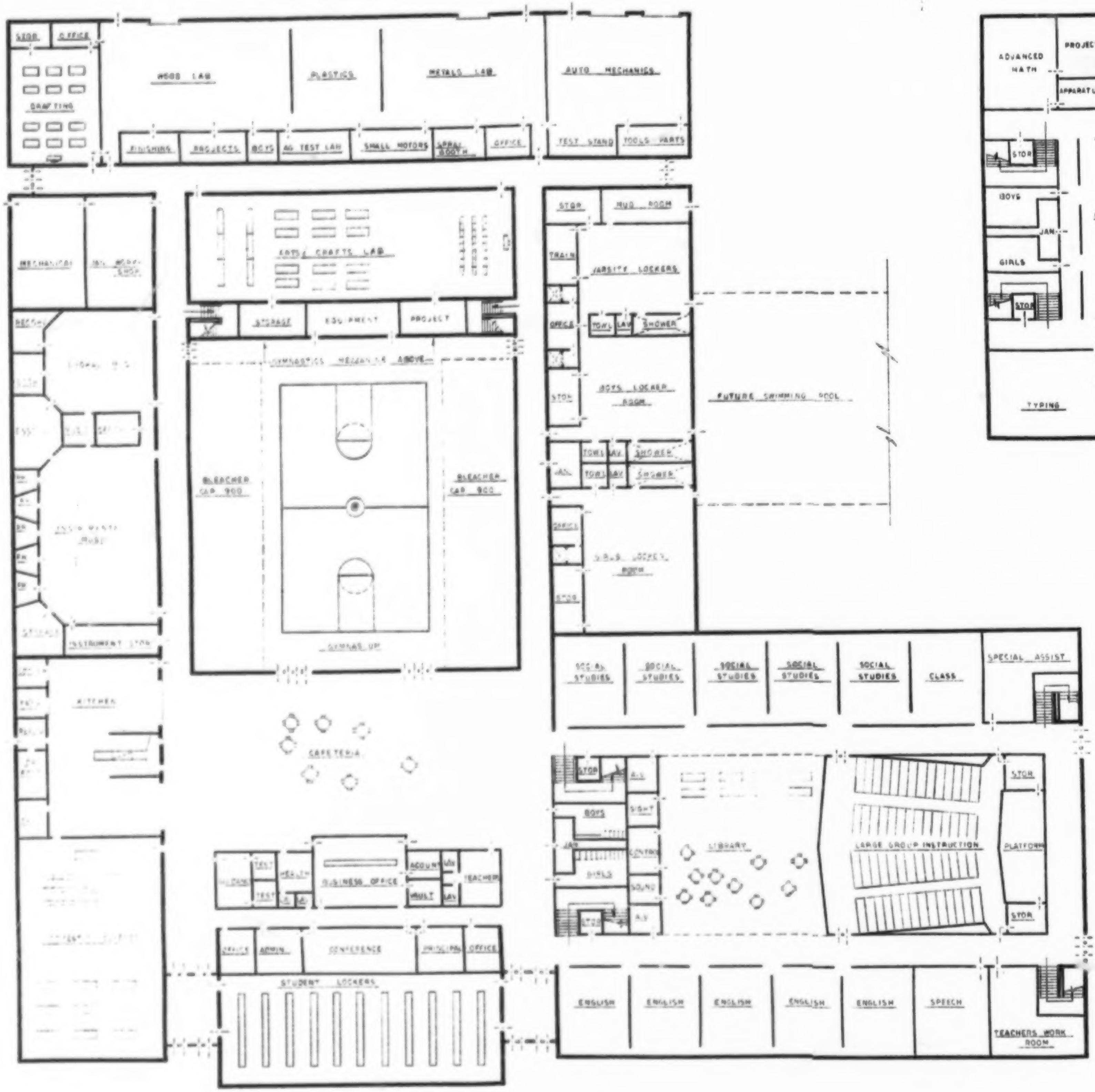
One interesting aspect of this plan, which conforms to the inter-relation of facilities in the modern school, is the immediate accessability between the food preparation kitchen and the domestic science laboratory. Many of our high school girls are seeking work in local food establishments and there is an increased need for practical training in large scale food preparation and service. This is the reason for the close location of the two facilities.

Another feature of the plan involving orientation is the location of the Little Theater with regard to the Commons-Cafeteria. We are always hard pressed to provide every feature desired by the Owner and within a limited budget. The Little Theater as designed will accommodate approximately 250 students, but by opening the folding wall between the Theater and the Commons area, this capacity can be increased considerably in an over-flow situation. Thus, a multi-use situation is created with the Commons area serving a number of important functions.

DESIGN COMMENTARY - Continued

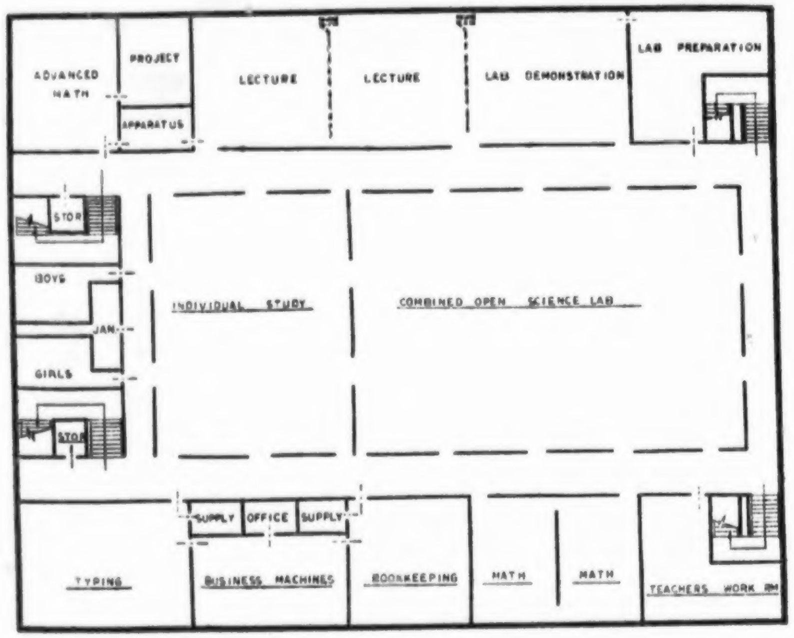
With the wide acceptance of carpeting as an ideal and economical floor covering material, this plan includes a central locker area for the students outer garments. By locating this facility near the main entrances, it is possible to lower the maintenance costs considerably and also increase the life span of the carpeting. An open concept school will not function properly with hard surfaced floors so, if we consider the open concept we must also consider carpeting.

The structural framing system and mechanical systems are less expensive in this plan as compared to those in Study #I, primarily because of the simplified design. This casts a definite reflection in the unit and total cost factors.


STOR
OFFICE
DRAFTING
WOOD LAB
PLASTICS
METALS LAB
AUTO MECHANICS
FINISHING
PROJECTS
BOYS
AG TEST LAB
SMALL MOTORS
SPRAY BOOTH
OFFICE
TEST STAND
TOOLS PARTS
MECHANICAL
ARTS & CRAFTS LAB
STORAGE
EQUIPMENT
PROJECT
GYMNASTICS MEZZANINE ABOVE
BLEACHER CAP 900
BLEACHER CAP 900
GYMNASIUM
STOR
MUD ROOM
TRAIN
VARSITY LOCKERS
OFFICE
TOWL
LAV
SHOWER
BOYS LOCKER ROOM
STOR
FUTURE SWIMMING POOL
GIRLS LOCKER ROOM
INSTRUMENTAL MUSIC
INSTRUMENT STOR
KITCHEN
CAFETERIA
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
CLASS
SPECIAL ASSIST
STOR
A.V.
BOYS
JAN
GIRLS
SIGHT
CONTROL
SOUND
LIBRARY
LARGE GROUP INSTRUCTION
PLATFORM
STOR
TEST
HEALTH
BUSINESS OFFICE
ACCOUNT
VAULT
TEACHER
ADMIN
CONFERENCE
PRINCIPAL
OFFICE
STUDENT LOCKERS
ENGLISH
ENGLISH
ENGLISH
ENGLISH
ENGLISH
SPEECH
TEACHERS WORK ROOM

WINNECONNE HIGH SCHOOL

SCALE 1/16" = 1'-0"


ADVANCED MATH
PROJECT
APPARATUS
LECTURE
LECTURE
LAB DEMONSTRATION
LAB PREPARATION
STOR
BOYS
JAN
GIRLS
STOR
INDIVIDUAL STUDY
COMBINED OPEN SCIENCE LAB
SUPPLY
OFFICE
SUPPLY
TYPING
BUSINESS MACHINES
BOOKKEEPING
MATH
MATH
TEACHERS WORK RM

SECOND FLOOR PLAN

SCALE 1/16" = 1'-0"

FIRST FLOOR AREA	106,982
SECOND FLOOR AREA	25,776
MEZZANINE AREA	5600
TOTAL AREA	132,758

STUDY IV

- BUILDING TYPE STUDIES -

TWO STORY - RECTILINEAR COMPACT - 41 TEACHING STATIONS - DESIGN CAP. 1025

Total Building Area	132,758 sq. ft.
Building Area per student	129 sq. ft.
Construction Cost per sq. ft.	$ 14.40
Construction Cost per student	$ 1,860.00
Total Construction Cost (Estimated)	$1,910,000.00

- LIST OF FACILITIES -

FIRST FLOOR FACILITIES:

- 5 Social Studies Classrooms	768 sq. ft. ea.
- Unassigned Classroom	768 sq. ft.
- Special Assistance Lab	900 sq. ft.
- 5 English Classrooms	768 sq. ft. ea.
- Speech Classroom	768 sq. ft.
- Instructional Materials Center Includes dual A-V storage rooms, sight, sound and control room.	3,960 sq. ft.
- Little Theater .... Capacity 230 Includes dual storage, platform (stage)	4,440 sq. ft.
- Girls Locker and Shower Area Includes office with shower, storage, towel room, lavatory and shower.	2,784 sq. ft.
- Boys Physical Education Locker Room Includes office with shower, storage, towels, lavatory and shower.	2,000 sq. ft.
- Varsity Team Room Includes mud room, storage, training room, office, towels, lavatory and showers.	2,000 sq. ft.
- Shop & Industrial Arts Includes:	11,136 sq. ft.
Drafting with office and storage	1,536 sq. ft.
Wood Lab with finishing, project, lavatory	2,784 sq. ft.
Plastics Lab with Ag Lab and small motors	1,536 sq. ft.
Metals Lab with spray booth and office	2,700 sq. ft.
Auto Mechanics Lab with test stand area and parts storage	2,300 sq. ft.

LIST OF FACILITIES - Continued

- Arts & Crafts Lab Includes stairwells, storage, project rooms and gymnasium storage.	5,376 sq. ft.
- Gymnasium ...... Capacity 1800	12,768 sq. ft.
- Commons - Cafeteria	6,720 sq. ft.
- Central Office and Student Services Area Includes guidance, 2 testing rooms, health, business office, accounting office, vault, teachers lounge, 4 lavatories, office, administrators office, principals office, conference room and guidance office.	4,000 sq. ft.
- Student Locker Area	3,650 sq. ft.
- Music Department Choral Music 1,368 sq. ft. Instrumental Music 2,400 sq. ft. Additional Facilities - recording, storage, ensemble, music storage, office, 5 practice rooms, general storage and instrument storage.	5,760 sq. ft.
- Kitchen and Food Service Includes cooler, freezer, refuse, washing, dry foods storage and office.	2,880 sq. ft.
- Home Economics Suite	3,650 sq. ft.

SECOND FLOOR FACILITIES:

- Gymnastics & Spectator Mezzanine	5,376 sq. ft.
- 2 Mathematics Classrooms	640 sq. ft. ea.
- Typing Classroom	1,280 sq. ft.
- Business Machines Lab Includes 2 supply rooms and office.	1,152 sq. ft.
- Bookkeeping Classroom	900 sq. ft.
- Teachers Work Room	900 sq. ft.
- Advanced Math Lab Includes project room and apparatus room.	1,344 sq. ft.
- 2 Lecture Rooms	1,024 sq. ft. ea.
- Lab Demonstration Room	1,200 sq. ft.
- Lab Preparation Room	900 sq. ft.
- Individual Study Area	2,850 sq. ft.
- Open Combination Science Laboratory	5,700 sq. ft.
- Miscellaneous Facilities: Corridors, Mechanical Equipment, Janitors, Toilets, Stairwells, Lobbies, etc.	
TOTAL USABLE AREA	132,758 sq. ft.

DESIGN COMMENTARY:

Of the three two-story, rectilinear plans presented in this section, this plan probably represents the best overall example of a balanced, functional facility. The straight lines and simplified structural system would also indicate that this would be the most economical to build. A comparison of the various room sizes will further indicate a stronger program particularly in the music, shop and physical education areas.

The Art and Crafts Laboratory includes an area of nearly 5,400 sq. ft. of open space. This area will accommodate several group activities and may well serve as two teaching stations if the operational budget will allow the improvement. Most of the storage facilities will be in the form of mobile units which can be relocated and used as area dividers. The location immediately adjacent to the shop area will also prove to be advantageous as many of the tools and materials may be shared with convenience.

The total shop facility encompasses a gross area of 11,136 sq. ft., or an area roughly equal to that of the gymnasium. All shop programs are included with the exception of a small motors laboratory which may be added without changing the total area. Since the agricultural courses are in a state of rapid change, most of the work may be accomplished in the testing lab and earth science lab. An Ag workshop, as such, will not be included in this program.

As in the preceding plan, the Domestic Science Lab is located directly adjacent to the main food preparation kitchen. There is a question as to the adequacy of size, which totals 3,650 sq. ft. With increased emphasis on vocational type training, this facility may require additional thought, however, it is larger than many similar facilities provided in schools with higher enrollments.

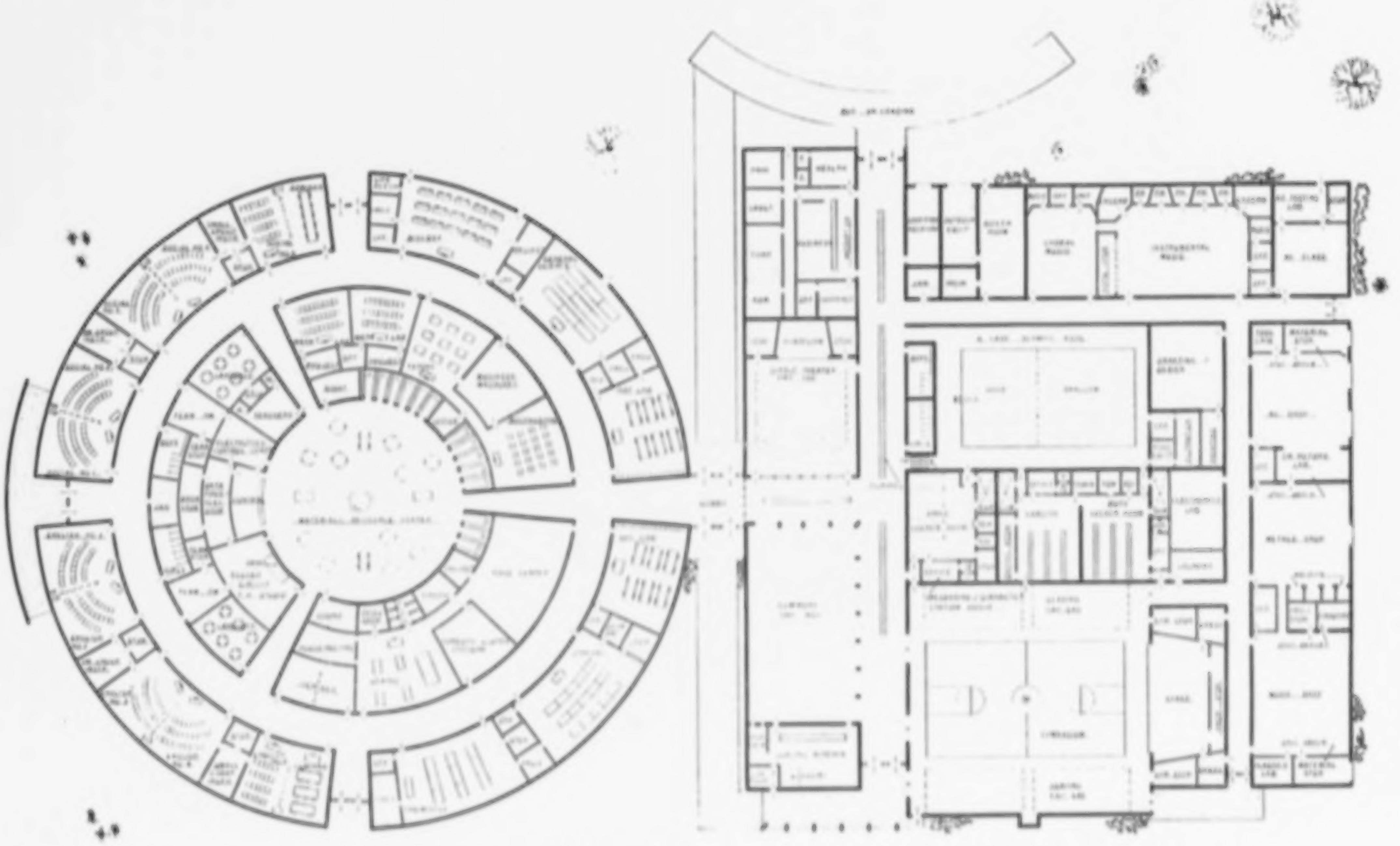
The locker and shower areas are very spacious and will accommodate the design enrollment plus an increase if necessary. These facilities have been located immediately adjacent to the gymnasium, but on an outside wall. In this manner, a swimming pool may be added at a later date without causing a need for duplicating the locker and shower areas, which would be very expensive. Similar to the preceding plans, the offices for the coaches have facilities for private showers, which is especially appreciated by visiting officials.

The academic area is an open concept type which can be readily changed as the changes in education and teaching methods indicate the need for revised orientation. The open laboratory area for the science activities will accommodate approximately 60-80 students at one time, and these students can be supervised by one or two laboratory technicians while engaged in individual experimentation. Separate lecture areas have been provided, and the advanced math room may become a computer center for both science and methematics research and advanced courses. A large individual study area has been provided to further strengthen the science-math departments and encourage individual study and research.

In the academic wing located on the first floor, we find English and Social Studies classrooms surrounding a central resource materials area and large group lecture facility. These class areas are open and immediately accessible to the resource materials. The little theater, when not in use by a large group, may be used for additional individual study facilities. A separate language laboratory area has not been included because of the current trend toward completely portable equipment. Therefore, the language lab will be self-contained and completely mobile.

Other features which give evidence to the effort to gain flexibility include moveable chalkboards, provisions for closed circuit television and provisions for complete dial-selectric programming. The number of load bearing walls has been reduced to an absolute minimum and an effort has been made to greatly reduce the number of column supports by using cantilever sections.

In total, this plan is both functional and economical, although we still experience a few of the traffic flow problems caused by stairways and intersecting corridors. Expansion possibilities are virtually unlimited and the central core facilities are adequate to accommodate an increased number of academic class areas. However, the district will probably not realize such a drastic increase in enrollment for a number of years.


HEALTH
CHORAL MUSIC
INSTRUMENTAL MUSIC
STAGE
GYMNASIUM

SPACE FOR LEARNING

ACADEMIC WING (CIRCULAR SECTION) [illegible]
VOCATIONAL & PHYSICAL EDUCATION (RECTANGULAR) [illegible]
SWIMMING POOL, SERVICE AREAS [illegible]
PHY-ED MEZZANINE, OBSERVATION DECK for POOL [illegible]

TOTAL CONSTRUCTION AREA [illegible]

TEACHING STATIONS

ACADEMIC WING 30 UNITS
VOCATIONAL WING 15 UNITS
TOTAL TEACHING STATIONS 45 UNITS

STUDY V

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - CIRCLE-RECTANGLE(COMPACT) - 45 TEACHING STATIONS

DESIGN CAPACITY 1125

Total Building Area	140,000 sq. ft.
Building Area per student	125 sq. ft.
Construction Cost per sq. ft.	$ 13.60
Construction Cost per student	$ 1,780.00
Total Construction Cost (Estimated).	$1,900,000.00
Plus $100,000.00 to Complete Pool	$2,000,000.00

- LIST OF FACILITIES -

ACADEMIC WING:

- 2 Social Science Suites Includes four academic class areas, small group instruction and storage.	2,216 sq. ft. ea.
- 2 Social Science Classrooms	620 sq. ft. ea.
- 2 English Suites Includes four acadmic classrooms, small group instruction and storage.	2,216 sq. ft. ea.
- 2 English Classrooms	720 sq. ft. ea.
- Biology Science Laboratory Includes life alcove, special project, office and project supplies.	1,920 sq. ft.
- General Science Lab Includes office, storage and project.	1,664 sq. ft.
- 2 Art Laboratories Includes office, project & storage.	1,600 sq. ft. ea.
- Physics Laboratory Includes office, desk room, storage, project work room.	2,050 sq. ft.
- Chemistry Laboratory Includes Office, Project work room, storage	2,180 sq. ft.
- Mathematics Laboratories Includes (2) classrooms, 2 project work rooms, office	1,770 sq. ft.
- Commercial Business Suite Includes Bookkeeping, Business machines and Typing	3,000 sq. ft.
- Domestic Science Laboratory Includes Office, Project work rooms, Food science, Sewing, Fitting, Housekeeping, Lecture	3,800 sq. ft.

ACADEMIC WING - Continued

- 2 Seminar Classrooms	320 sq. ft. ea.
- 2 Language Laboratories	580 sq. ft. ea.
- 2 Team Rooms Includes storage	260 sq. ft. ea.
- Closed Circuit T.V. Studio	960 sq. ft.
- Data Processing Lab	420 sq. ft.
- Electronics Control Programing Center	468 sq. ft.
- Materials Resource Center Includes Library Control Room, Sound Room, Sight Room, Book Stock Areas	10,000 sq. ft.
- Teachers Work Room Includes Lavatories	500 sq. ft.

VOCATIONAL, ACTIVITY WING

_ Administrative and Student Services Includes Health Room, Business Office, Guidance, Counselor's Office, Administrator, Conference, Principal, Vault, Dual Lavatories	3,500 sq. ft.
- Little Theatre (Capacity 150) Includes Stage, Storage Rooms	3,264 sq. ft.
- Commons - Cafeteria	4,130 sq. ft.
Kitchen (Serving only)	1,344 sq. ft.
- Mechanical Equipment Area Includes Shipping & Receiving, Outdoor equipment, Janitors closet, Incinerator Room, Boiler Room	2,496 sq. ft.
- Music Department Includes Instrumental Music, Choral Music, Dual offices, Ensemble(2), Instrument Storage, Uniform Storage, Music Storage, (5) Practice Rooms	5,100 sq. ft.
- Agriculture Class Area Includes classroom, Agriculture Testing Lab, Storage	1,640 sq. ft.
- Main Shop Area Includes Agriculture shop, Small motors Lab, Office, Material Storage, Tool Crib, Metals Shop, Welding, Office, Project Storage, Finishing, Wood Shop, Plastics Lab, Materials Storage, Electronics Lab, Printing Lab, Drafting and Design Lab	10,660 sq. ft.
- Swimming Pool Includes Dual Toilet facilities, Office, Pool equipment storage, Filtration Equipment	7,000 sq. ft.
- Locker and Shower Rooms Includes Boys locker, girls locker, varsity locker, (3) shower units, (2) towel rooms, (3) Lavatories, Storage, Training room, Office, Laundry	5,470 sq. ft.

VOCATIONAL, ACTIVITY WING - Continued

- Gymnastics and Spectators Mezzanine	5,470 sq. ft.
- Gymnasium, Includes Stage, Dressing Room, Storage	13,200 sq. ft.
- Miscellaneous Facilities - Corridors, Lobbies, Sanitary Facilities, Stairwells, Storage Room, Janitors Rooms	
TOTAL BUILDING AREA	140,000 sq. ft.

DESIGN COMMENTARY:

It is recognized, by the majority of educators, that the emphasis concerning facility orientation has shifted, with the Instructional Materials Center assumming the role of primary importance. In approaching the design of this facility, it was decided to place the library - materials center in the center of the academic circle with immediate access to all class areas.

This plan includes two defined zones: The Academic "quiet" Zone and, the Physical Activity "noise" Zone. The latter area includes the cafeteria, shops, music, gymnasium, and swimming pool. In the academic area, the class areas are defined with non-load bearing walls which may be removed without causing structural problems. With increased emphasis placed on the open concept type planning, this plan offers many possibilities because of the absence of bearing walls.

Another feature of the flexibility, is the future possibility of adding a second academic wing on the opposite side of the sound area. This would increase the design enrollment to 2,000 or more students. The control core facilities in the center of the structure will accommodate this expansion with no serious crowding problems. In effect, we will then have two schools in one unit which has proven to be popular in other parts of the country. The potential is unlimited at a very favorable cost factor.

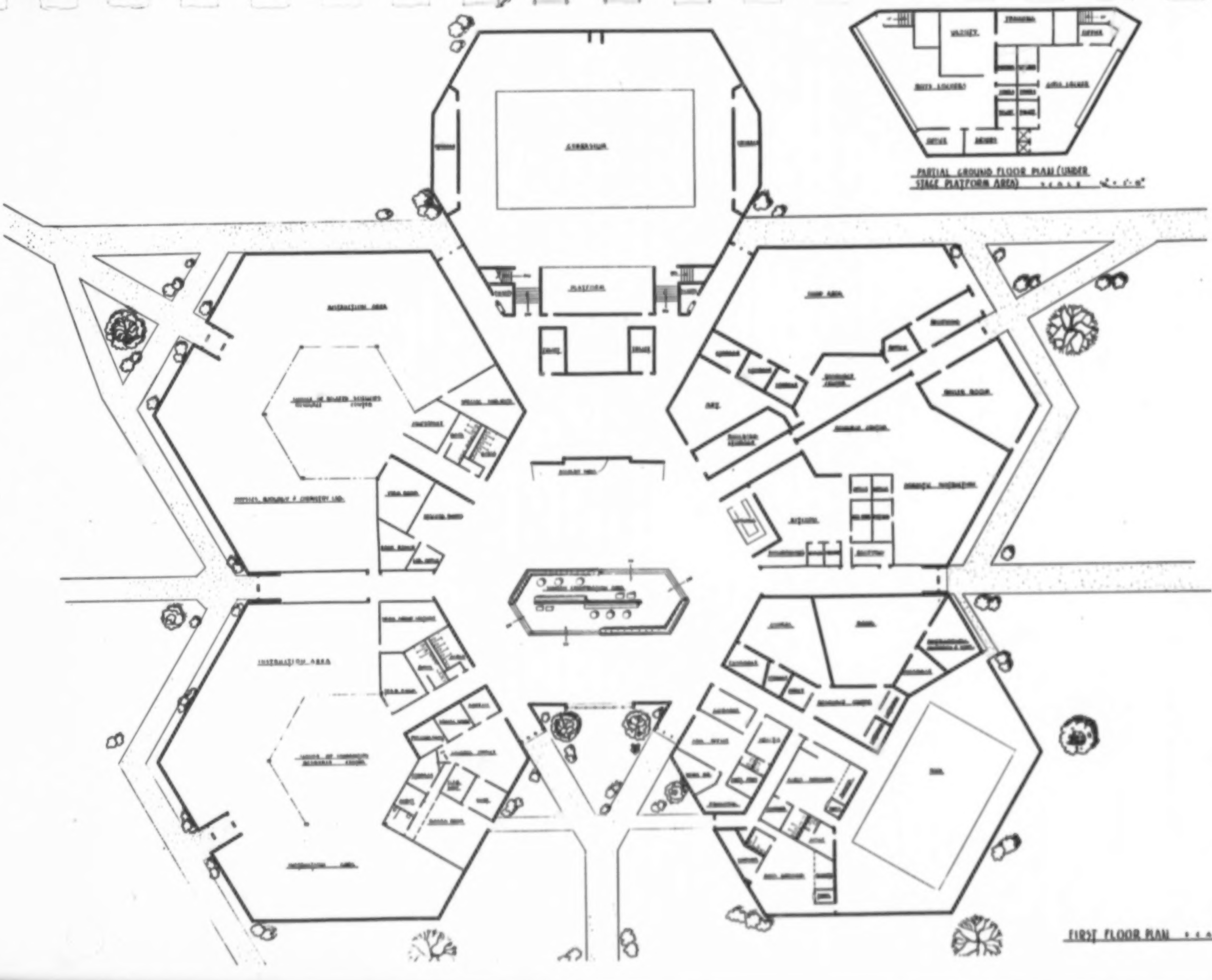
Data processing and a control electronics studio represent uncommon features to the materials center. We must recognize the fact that with increased research and lowered costs through competition, our schools will become more electronic-oriented with each passing year.

Along with the importance of flexibility in the structural system, we also have an immediate need in the mechanical installation. The use of a control air-handling system with a flexible ceiling and duct work will allow unlimited changes anytime in the future. These changes will occur largely in the academic portion and, the circular configuration becomes an important asset because of the great reduction in the number of bearing walls required.

A quick study of the space allocations for the various academic facilities will indicate the spaciousness of the various specialized laboratories. The I.M.C. for example, encompasses an area of 10,000 square feet which represents the area found in many of our high school gymnasiums.

DESIGN COMMENTARY - Continued

If the building were to be converted to the open concept with the removal of walls, classroom doors, hardward, painting, and individual room thermostats; the estimated cost could be lowered appreciably and, the functional possibilities enhanced with greater flexibility. We have estimated that this reduction will amount to at least $1,800.00 per class unit and, if we project this figure to include all of the outer-ring facilities; the cost factor could easily total $300,000.00. This savings could be used to buy many of the teaching tools which are too often deleted because of the high cost of the structure. In other words, the aesthetic qualities and frills to enhance the appearance of the building should not be the controlling factor.


BOYS LOCKERS
GIRLS LOCKERS
OFFICE
PLATFORM
INSTRUCTION AREA
PHYSICS, BIOLOGY & CHEMISTRY LAB.
INSTRUCTION AREA
MUSIC ROOM

PARTIAL GROUND FLOOR PLAN (UNDER STAGE PLATFORM AREA) SCALE 1/8" = 1'-0"

FIRST FLOOR PLAN SCALE 1/8" = 1'-0"

STUDY VI

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - HEXAGONAL CENTER - 28 TEACHING STATIONS

DESIGN CAPACITY 700

Total Building Area	123,000 Sq. Ft.
Building Area per Student	172 Sq. Ft.
Construction Cost per Sq. Ft.	18.20
Construction Cost per Student	$ 3,160.00
Total Construction Cost (Estimated)...	$ 2,238,600.00

DESIGN COMMENTARY

This plan represents one of several prepared for the Board of Education in Markesan and, although there are a number of interesting features included; the plan was abandoned for that community. There was justified concern that the voters in a conservative community would not support a plan of this nature because it is controversial. The apparent cost factor was also of concern to the Board and Citizens Committee.

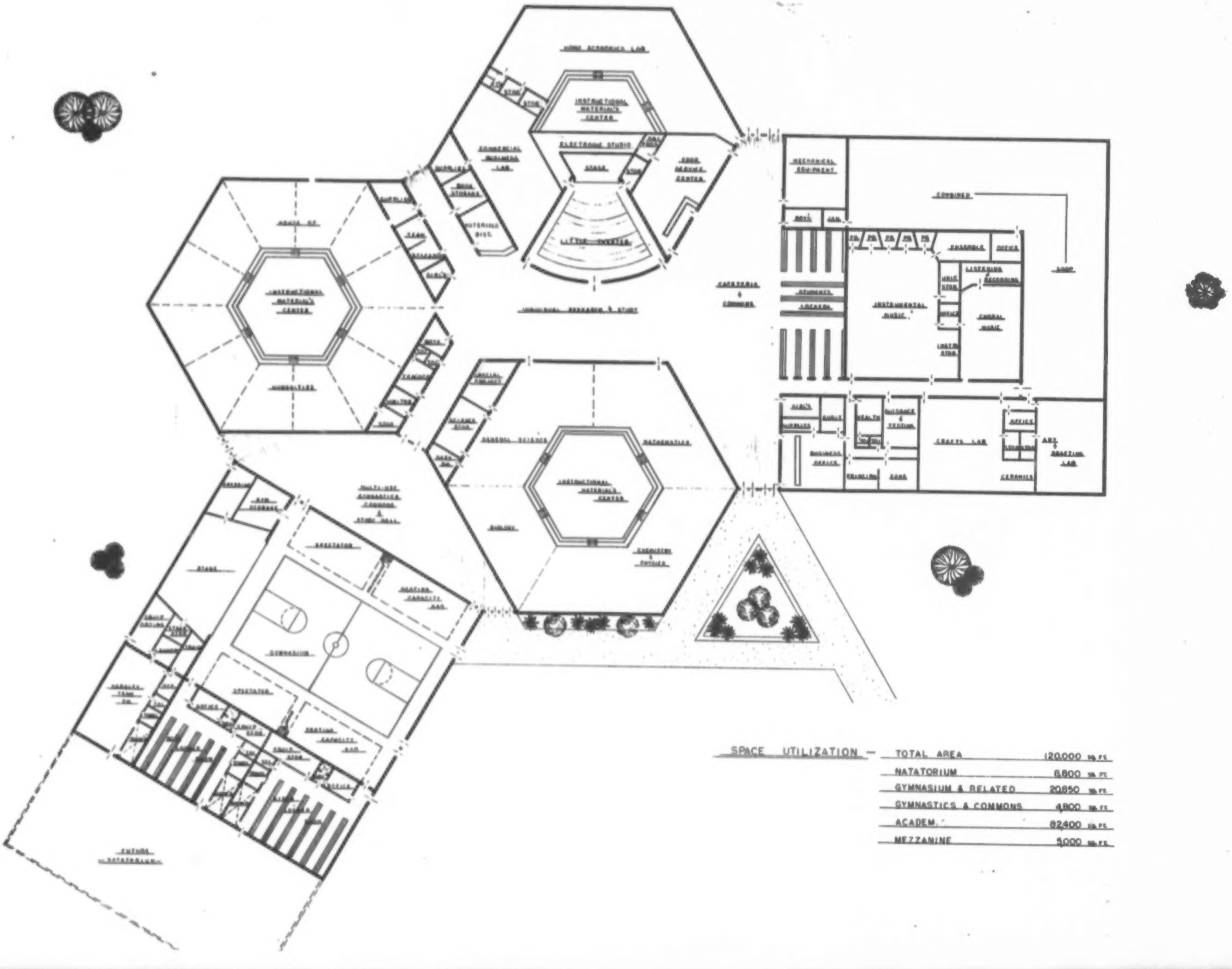
Once again, the importance of the functional materials center for individual study and research has a basic place in this design. The unusual aspect in this philosophy is indicated by the fact that specialized materials centers have been planned in Music, Shop and Home Economics areas as well as in the Science and Academic houses. This idea came from the administrator who possesses a broad knowledge of the space requirements for modified flexible scheduling and, in this instance, a Bace III program. The emphasis is centered on independent and small group study with complete freedom in the use of facilities.

The independent "house" idea is indicated in the humanities and science-math centers which represents an ideal approach for the Base III. In many instances, the student will be assigned to one house for a thirteen week modal and probably program his subjects for that period of time. This will reduce the amount of student movement between houses and within each house which strengthens the function of the open concept. Distraction caused by physical activity will be held to a minimum.

Another design situation, which has increased the over-all cost of this building, relates to the isolation of the gymnasium from the swimming pool. Because of the remote location of these two facilities, it is necessary to provide two separate locker and shower facilities. In most of our designs, we attempt to locate the gym and pool together with one set of locker and shower facilities to serve both facilities. The location of a gymnastics - multi-use mezzanine above the locker rooms also represents a definite advantage which is not possible with this plan.

DESIGN COMMENTARY - Continued

There is no question about the increased cost of the pod-design and particularly with this plan. Although the estimate of $18.20 per square foot is only slightly above the average for the State; it is considerably higher than the other plans presented in this publication.


HOME ECONOMICS LAB
INSTRUCTIONAL MATERIAL'S CENTER
ELECTRONIC STUDIO
STAGE
LITTLE THEATER
FOOD SERVICE CENTER
COMMERCIAL BUSINESS LAB
SUPPLIES
BOOK STORAGE
MATERIALS DIST.
INDIVIDUAL RESEARCH & STUDY
CAFETERIA & COMMONS
MECHANICAL EQUIPMENT
COMBINED
SHOP
BOYS
JAN.
PR
ENSEMBLE
OFFICE
LISTENING & RECORDING
STUDENTS LOCKERS
INSTRUMENTAL MUSIC
CHORAL MUSIC
GIRLS
HEALTH
GUIDANCE & TESTING
BUSINESS OFFICE
CRAFTS LAB
CERAMICS
ART & DRAFTING LAB
INSTRUCTIONAL MATERIAL'S CENTER
HUMANITIES
INSTRUCTIONAL MATERIAL'S CENTER
GENERAL SCIENCE
MATHEMATICS
BIOLOGY
CHEMISTRY & PHYSICS
MULTI-USE GYMNASTICS COMMONS & STUDY HALL
SPECTATOR
STAGE
GYMNASIUM
SPECTATOR
FUTURE NATATORIUM

SPACE UTILIZATION —

TOTAL AREA	120,000 SQ. FT.
NATATORIUM	6,800 SQ. FT.
GYMNASIUM & RELATED	20,850 SQ. FT.
GYMNASTICS & COMMONS	4,800 SQ. FT.
ACADEM.	82,400 SQ. FT.
MEZZANINE	5,000 SQ. FT.

STUDY VII

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - POD CLUSTER - 32 TEACHING STATIONS

DESIGN CAPACITY 800

Total Building Area	120,000 Sq. Ft.
Building Area per Student	150 Sq. Ft.
Construction Cost per Sq. Ft.	$ 14.80
Construction Cost per Student	$ 2,230.00
Total Construction Cost (Estimated)	$ 1,780,000.00

- LIST OF FACILITIES -

- Academic House:	
12 Academic Class Areas	760 Sq. Ft. Ea.
Instructional Materials Center	2,650 Sq. Ft.
- Science House:	
4 Mathematics Class Areas	600 Sq. Ft. Ea.
Chemistry and Physics Laboratory	3,000 Sq. Ft.
Biology and Earth Science	1,500 Sq. Ft.
General Science Lab	2,310 Sq. Ft.
Instructional Materials Center	2,650 Sq. Ft.
- Home Economics Lab	3,600 Sq. Ft.
- Little Theatre Includes Electronics Studio, Stage, Storage	3,600 Sq. Ft.
- Commercial Business Lab	2,300 Sq. Ft.
- Combined Shop Area Includes Drafting Classroom, Office, Storage	11,000 Sq. Ft.
- Crafts Laboratory	2,460 Sq. Ft.
- Music Suite Includes Instrumental Music, Choral Music, (5) Practice Rooms, Ensemble, Offices, Storage, Etc.	6,000 Sq. Ft.
- Cafeteria - Commons	5,600 Sq. Ft.
- Individual Study and Research	4,500 Sq. Ft.
- Multi-use Gymnastics, Commons	4,800 Sq. Ft.
- Gymnasium, Locker, Showers, Offices, Mezzanine, Etc	25,000 Sq. Ft.
- Miscellaneous Facilities Includes Lavatories, Kitchen, Teachers Rooms, Miscellaneous Storage, Mechanical Equipment, Etc.	
TOTAL BUILDING AREA	120,000 Sq. Ft.

DESIGN COMMENTARY:

In a continued study of the planning process in Markesan, we were forced to reduce the cost factor by a considerable margin. Reductions were made in the size of the building and the basic orientation is simplified to reduce the total budget. Actually, the number of teaching stations increased through a more functional use of space. The hexagonal shapes were deleted in favor of rectilinear areas in the gymnasium and shop locations.

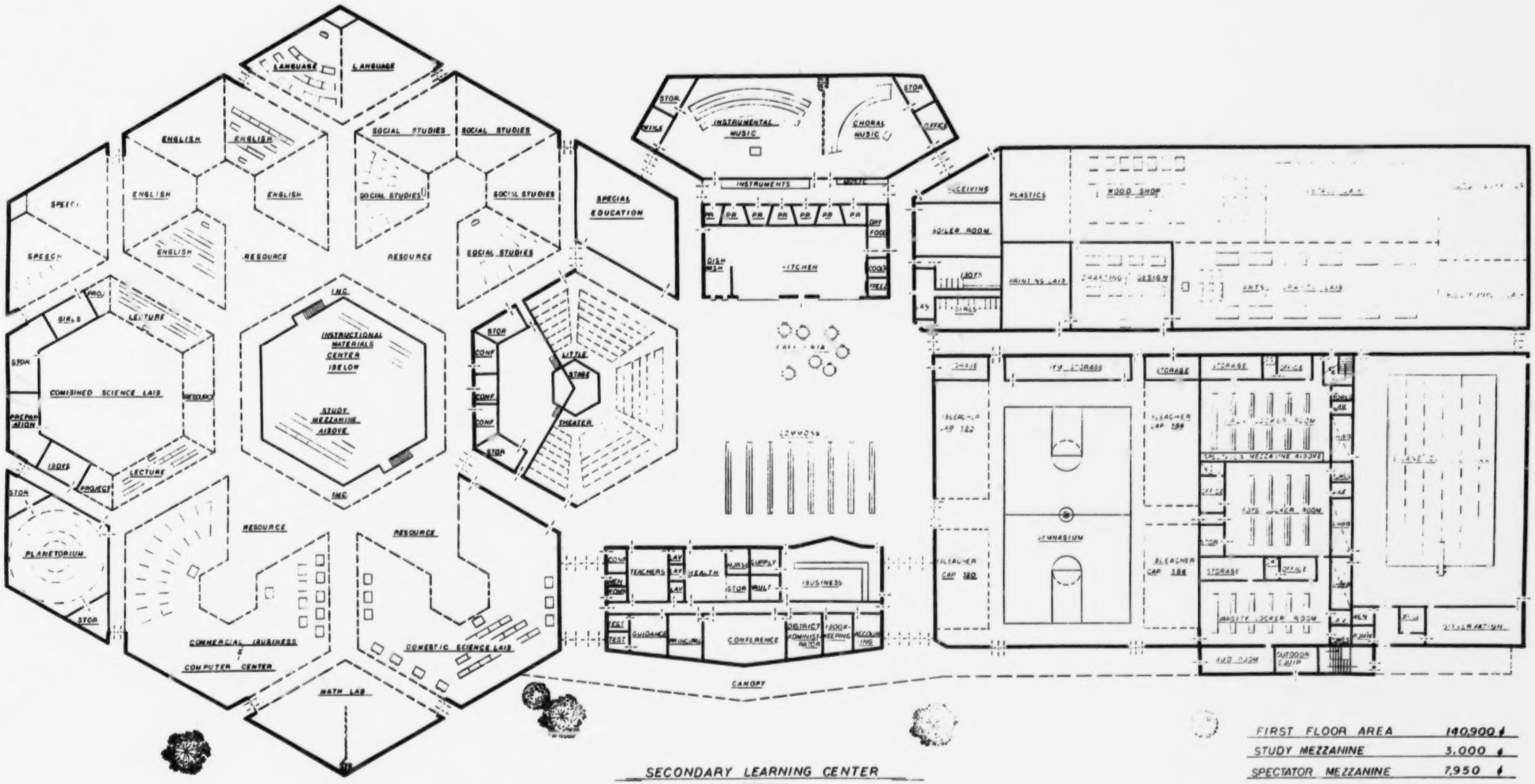
In this plan many of the individual materials research areas were eliminated and the teaching spaces increased. Irregular shaped classrooms and auxillary rooms were redesigned to provide functional areas more adaptable to future change. All of these modifications resulted in a simplification of the structural and mechanical systems thus lowering the cost.

The "House" concept is maintained in three hexagonal pods, all of which include individual materials centers oriented to that particular house. In addition, a large area is provided to allow the student to leave the house for general individual study and research. This facility can be compared to a central library in a conventional school.

Another change involves the gymnastics, commons, study area provided immediately adjacent to the gymnasium. This area may be used for a number of purposes, but it is primarily oriented for physical activities. It will also serve as a milling area for the general public during athletic events. The entire philosophy is to provide many open space areas which can serve a number of functions and thus gain economy thru multi-use.

It becomes obvious, in the academic areas, that the hexagonal pod affords the same opportunity for symmetry as experienced with the circle. The I.M.C. is equally accessible from all of the class areas and this facility becomes the apex or focal point of each house. Expansion of the total building becomes no problem as the specialized areas, such as the gymnasium and shops, are not locked in by surrounding facilities. The academic areas may be increased with additional hexagonal pods to ultimately increase the cluster.

Here again, separate student locker areas have been provided in the immediate proximity of the main entrances to reduce the noise and decrease maintenance costs. The basic educational philosophy involves modular scheduling through use of the Base III. Therefore, the "House" or "Pod" design gains greater significance in the planning.


LANGUAGE
LANGUAGE
ENGLISH
ENGLISH
ENGLISH
ENGLISH
ENGLISH
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
SPEECH
SPEECH
RESOURCE
RESOURCE
RESOURCE
RESOURCE
SPECIAL EDUCATION
INSTRUMENTAL MUSIC
CHORAL MUSIC
STOR
OFFICE
STOR
OFFICE
INSTRUMENTS
MUSIC
PR
DRY FOOD
DISH WSH
KITCHEN
COOL
FREEZ
CAFETERIA
COMMONS
PROJ
GIRLS
LECTURE
STOR
COMBINED SCIENCE LAB
RESOURCE
PREPARATION
BOYS
PROJECT
LECTURE
INC.
INSTRUCTIONAL MATERIALS CENTER BELOW
STUDY MEZZANINE ABOVE
INC.
STOR
CONF
CONF
CONF
STOR
LITTLE STAGE
THEATER
STOR
PLANETORIUM
STOR
COMMERCIAL BUSINESS & COMPUTER CENTER
DOMESTIC SCIENCE LAB
MATH LAB
CONF
TEACHERS
LAV
LAV
LAV
HEALTH
NURSE
SUPPLY
STOR
MULT
BUSINESS
TEST
TEST
GUIDANCE
PRINCIPAL
CONFERENCE
DISTRICT ADMINISTRATOR
BOOKKEEPING
ACCOUNTING
CANOPY
RECEIVING
BOILER ROOM
BOYS
GIRLS
PLASTICS
PRINTING LAB
WOOD SHOP
DRAFTING DESIGN
ARTS & CRAFTS LAB
STORAGE
STORAGE
STORAGE
OFFICE
BLEACHER CAP 122
BLEACHER CAP 120
GYMNASIUM
BLEACHER CAP 184
BLEACHER CAP 184
SPECTATOR MEZZANINE ABOVE
BOYS LOCKER ROOM
OFFICE
STOR
STORAGE
OFFICE
VARSITY LOCKER ROOM
AUD ROOM
OUTDOOR EQUIP
MEN
WOMEN
CIRCULATION

SECONDARY LEARNING CENTER

WINNECONNE, WISCONSIN

SCALE: 1/16" = 1'0"

FIRST FLOOR AREA	140,900 ¢
STUDY MEZZANINE	3,000 ¢
SPECTATOR MEZZANINE	7,950 ¢
TOTAL AREA	151,850 ¢

STUDY VIII

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - HEXAGON - RECTANGLE - 44 TEACHING STATIONS

DESIGN CAPACITY 1100

Total Building Area	151,850 Sq. Ft.
Building Area per Student	144 Sq. Ft.
Construction Cost per Sq. Ft.	$ 13.00
Construction Cost per Student	$ 1,970.00
Total Construction Cost (Estimated)	$ 1,970,000.00

- LIST OF FACILITIES -

ACADEMIC WING	60,000 Sq. Ft.
- Mathematics Class Areas (2 units)	2,000 Sq. Ft.
- Planetarium, dual storage rooms	2,000 Sq. Ft.
- Speech (2 units)	2,000 Sq. Ft.
- Language Laboratories (2 units)	2,000 Sq. Ft.
- Science Laboratory .... (Lab units for 90 Students) Includes Lecture, Resource, Lavatories, Preparation, Storage	5,500 Sq. Ft.
- English Cluster (5 Class Areas) .... Includes Resource, Storage	5,500 Sq. Ft.
- Social Studies (5 Class Areas) .... Includes Resource center, Storage	5,500 Sq. Ft.
- Commercial Business and Computer Center	5,500 Sq. Ft.
- Domestic Science .... Includes Resource Area	5,500 Sq. Ft.
- Instructional Materials Center .... (First Floor Level)	5,000 Sq. Ft.
- Instructional Materials Center .... (Mezzanine Level)	3,400 Sq. Ft.
- Little Theatre (Capacity 260)............... Includes Electronics Center, Storage, Conference Rooms, Stage	5,000 Sq. Ft.
- Special Education	2,000 Sq. Ft.
VOCATIONAL WING - PHYSICAL	46,400 Sq. Ft.
- Gymnasium (Seating Capacity 1300 on Main Floor) Includes 3 Storage Areas	12,000 Sq. Ft.
- Locker and Shower Rooms	7,600 Sq. Ft.
- Olympic Size Swimming Pool .... Includes Dual Lavatories, Office, Observation Room	7,900 Sq. Ft.
- Gymnastics - Spectators Mezzanine	7,950 Sq. Ft.

VOCATIONAL WING - PHYSICAL - Continued

- Shops, Art, Labs Includes Plastics, Painting Lab, Drafting, Woods, Metals, Auto Mechanics, Electronics Lab	15,000 Sq. Ft.
- Music Department Includes Instrumental, Choral, Dual Offices, Storage, Instrument Storage, (7) Practice Rooms	5,800 Sq. Ft.
- Miscellaneous Facilities -	
Kitchen	2,160 Sq. Ft.
Cafeteria - Commons	10,000 Sq. Ft.
Administration - Student Services	5,200 Sq. Ft.
TOTAL BUILDING AREA	151,850 Sq. Ft.

DESIGN COMMENTARY :

The following three plans represent several of the design solutions offered to the Winneconne District to solve their problem of over-crowded high school facilities. Once again, the cost factor is of extreme importance and, the three plan process indicates the sequence of planning revisions and cost reductions deemed necessary because of an unsuccessful referendum. The plan under consideration in this section represents the design submitted to the electorate and that which ultimately failed.

In the previous discussions, the need for flexibility, economy and function have been emphasized and evaluated yet, none of the plans represent the ultimate solution. This plan nearly approaches the total open concept as related to the high school curriculum. The academic and vocational training areas are virtually wall and column free through the use of economical long span framing.

The academic wing represented by the hexagonal shape encompasses an area of 60,000 square feet with no load bearing walls. The roof area is supported by twelve (12) structural columns with no other physical supports. The dotted lines indicating class areas are area designations only and do not represent division walls of any type. All sight and sound separations are achieved through the use of moveable chalkboards and tackboards mounted on heavy casters. Our main purpose is to provide adequate open space which can be completely revised many times in the future. The open plan allows this change without the usual inherent expense associated with the conventional building.

When considering individual areas, the science program is of particular interest in that all science tables and work areas are open to the remainder of the school. Our laboratory equipment can easily accommodate 90 students at a single session and duplication of equipment is not necessary because there are no separate class areas. Even the storage units have been designed on casters and storage rooms, as such, have been eliminated. Costs have been lowered because of the concentration of the utilities required within this area. Sketches of the science lay-out are available upon request.

DESIGN COMMENTARY - Continued

Many of the advantages offered in the science department can also be found in both the home economics and commercial departments and the main strength is more than adequate space. These areas are not restricted and can experience complete change of utilization without expense. Both of these departments have specialized materials centers that open directly into the main library and individual research area, located in the apex of the hexagon. The social studies and english areas also have their own resource centers with specialized study material oriented to these courses.

The effort to centralize the main library - materials center has been accomplished in this plan. This area, when combined with the teacher-student mezzanine, located in the immediate center of the academic wing, yields approximately 8,400 square feet. This area does not include the space allocated for specialized materials and, if we include these facilities we have a total IMC space of nearly 12,000 square feet. There should be little doubt as to the importance of the IMC - library.

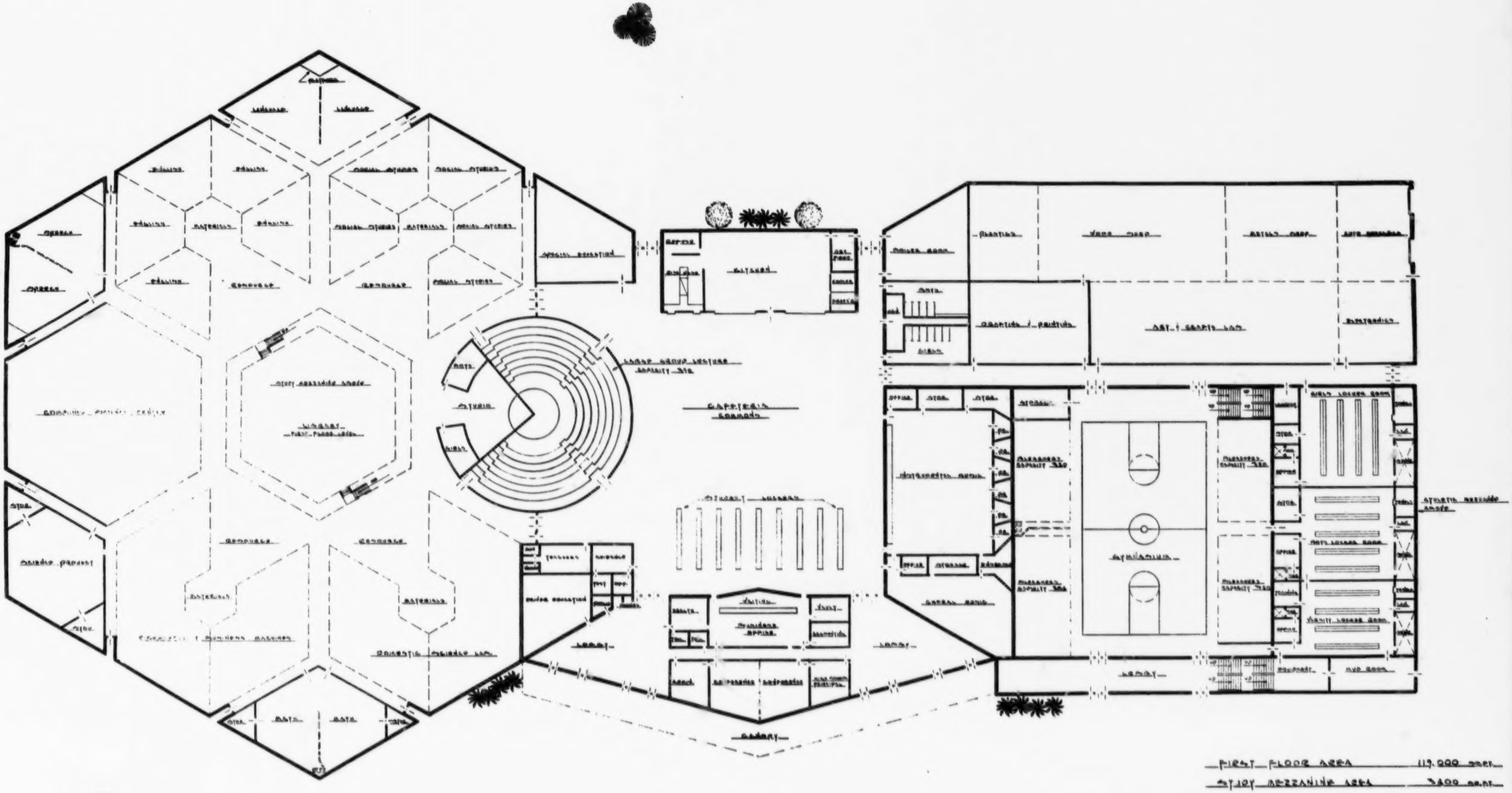
Another unusual feature of this design is evidenced in the vocational training area, where walls have been eliminated and all of the shop areas flow into a common space. The art and crafts area is directly associated with the plastics, woods, metals and printing shops, thus allowing complete freedom of movement for all students. Another advantage of this open orientation is the ability to share tools and specialized equipment between all of the areas. Since all areas involve higher noise levels than experienced in the academic portion, it was not necessary to provide buffer zones. This open space design will allow open laboratory activities with a minimum of teacher supervision particularly where long-term projects are in progress.

The music department is located in a removed position from the remainder of the school in a separate pod. This location and the increased cost may be questioned, however, there are several advantages. Immediate accessibility to the athletic field for outside drill and the complete isolation of sound represent two advantages. Another feature involves the location of the instrument storage and practice rooms accessible through a separate corridor. In this feature, the student can secure his instrument and use the practice rooms without entering the main music areas. This feature will prevent disrupting the large group class, yet allow full use of the practice rooms.

As indicated in earlier discussions, the advantage of a separate locker area for students to decrease noise problems and lower maintenance costs has been considered in this plan. Since the entire academic wing will require carpeting, it is advantageous to keep the locker area immediately adjacent to the main entrances. By increasing the fresh air ventilation in the cafeteria - commons area, we also take care of the odor problem caused by wet clothing. through the use of open locker areas with private cubicles, this ventilation will be particularly effective.

DESIGN COMMENTARY - Continued

Although this facility is designed primarily for Flexible Modular Scheduling, there is no reason to limit the facility to that type of programing. It is difficult to effectively use a closed-classroom concept for flexible scheduling, but an open plan does not present a problem for any type of scheduling presently employed in education. The possibility for future change and flexibility is virtually unlimited. The cost factor represents another side advantage of the open concept and, approximately $2.00 per square foot can be added if the same facilities are provided in a closed plan.


LIBRARY
FIRST FLOOR AREA
STUDY MEZZANINE ABOVE
COMMUNITY ACTIVITY CENTER
STUDIO
LARGE GROUP LECTURE
CAPACITY 312
CAFETERIA
COMMONS
KITCHEN
OFFICE
STUDENT LOCKERS
LOBBY
GALLERY
SPECIAL EDUCATION
SOCIAL STUDIES
MATERIALS
COMMONS
SCIENCE PROJECT
STOR.
DOMESTIC SCIENCE LAB.
COMMERCIAL & BUSINESS MACHINES
BOILER ROOM
PLANTING
WOOD SHOP
METALS SHOP
AUTO MECHANICS
DRAFTING & PRINTING
ART & CRAFTS LAB
ELECTRONICS
BOYS
GIRLS
INSTRUMENTAL MUSIC
CHORAL MUSIC
STORAGE
BLEACHERS
CAPACITY 320
GYMNASIUM
GIRLS LOCKER ROOM
BOYS LOCKER ROOM
VARSITY LOCKER ROOM
ATHLETIC MEZZANINE ABOVE
EQUIPMENT
MUD ROOM

FIRST FLOOR AREA	119,000 SQ.FT.
STUDY MEZZANINE AREA	3400 SQ.FT.
ATHLETIC MEZZANINE AREA	6700 SQ.FT.
TOTAL AREA	129,100 SQ.FT.

SECONDARY

LEARNING-CENTER

SCALE 1/16" = 1'-0"

STUDY IX

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - HEXAGONAL - RECTILINEAR - 43 TEACHING STATIONS

DESIGN CAPACITY 1075

Total Building Area	129,100 Sq. Ft.
Building Area per Student	120 Sq. Ft.
Construction Cost per Sq. Ft.	13.40
Construction Cost per Student	$ 1,600.00
Total Construction Cost (Estimated)	$ 1,730,000.00

- LIST OF FACILITIES -

ACADEMIC WING	55,000 Sq. Ft.
- Mathematics Class Areas (2 units)	1,800 Sq. Ft.
- Science Project Class	1,800 Sq. Ft.
- Speech (2 units)	1,800 Sq. Ft.
- Language Laboratories (2 units)	1,800 Sq. Ft.
- Science Laboratory (Lab units for 80 Students) Includes Lecture Areas, Lavatories, Storage, Preparations, Etc.	5,000 Sq. Ft.
- English Cluster (5 class areas) Includes Resource Area, Storage	5,000 Sq. Ft.
- Social Studies (5 class areas) Includes Resource Area, Storage	5,000 Sq. Ft.
- Commercial Business - Computer Center Includes Resource Area	5,000 Sq. Ft.
- Domestic Science Includes Resource Area	5,000 Sq. Ft.
-Instructional Materials Center (First Floor Level)	5,000 Sq. Ft.
- Instructional Materials Center (Mezzanine Level)	3,200 Sq. Ft.
- Little Theatre (Capacity 300) Includes Electronics Studio, Stage, Lavatories	5,000 Sq. Ft.
- Special Education	1,220 Sq. Ft.
- Drivers Education	720 Sq. Ft.

LIST OF FACILITIES - Continued

VOCATIONAL TRAINING WING - PHYSICAL ACTIVITIES	48,500 Sq. Ft.
- Gymnasium .... (Seating Capacity on Main Floor - 1350) Includes Lobby, Storage, Stairwell	12,480 Sq. Ft.
- Shop - Art Area .... Includes Plastics, Woods, Metals, Auto Mechanics, Electronics, Drafting and Printing, Art, Crafts, Etc.	13,000 Sq. Ft.
- Locker and Shower Areas	7,000 Sq. Ft.
- Athletic Mezzanine.......................... (Gymnastics and spectators)	6,700 Sq. Ft.
- Music Department .... Includes Instrumental, Choral, Storage, Offices, (6) Practice Rooms, Ensemble, Instrument Storage	4,750 Sq. Ft.
- Miscellaneous Facilities -	
Kitchen with Dry Food Storage	2,432 Sq. Ft.
Cafeteria - Commons	10,800 Sq. Ft.
Administration - Student Services	3,312 Sq. Ft.
TOTAL BUILDING AREA	129,100 Sq. Ft.

DESIGN COMMENTARY:

Following the defeat of the initial referendum in Winneconne, it was determined that the bond issue would not be accepted in the amount of $2,500,000.00 and cuts would have to be made. The swimming pool was the largest total facility eliminated and, this deletion also resulted in a reduction of the total area allocated for the shops and art department.

Basically, the function has remained similar to that in the proceeding plan and although the swimming pool was eliminated, the locker and shower facilities will allow the addition of the pool at a future date if approved by the electorate. The gymnastics - spectator mezzanine has remained in the plan and this facility will serve the gymnasium with knock-out walls provided to serve what may become the swimming pool area in the future. The mezzanine will also be utilized as a third physical education facility which should be required for the ultimate enrollment of 1075 students.

Another change which may not improve the function, but will lower the cost, is the relocation of the music facility. The practice rooms are no longer independent of the main music rooms, therefore, the utilization of these rooms may be restricted. In addition, the total space allotted to the music department has been reduced to a minimum for the projected enrollment. The location should not present a problem because it is located in an area of higher noise level - ie. the gymmasium, shops and cafeteria - commons areas are not quiet zones. Accessibility to the outside is quite functional and movement of music students will have no affect on the students in the academic areas.

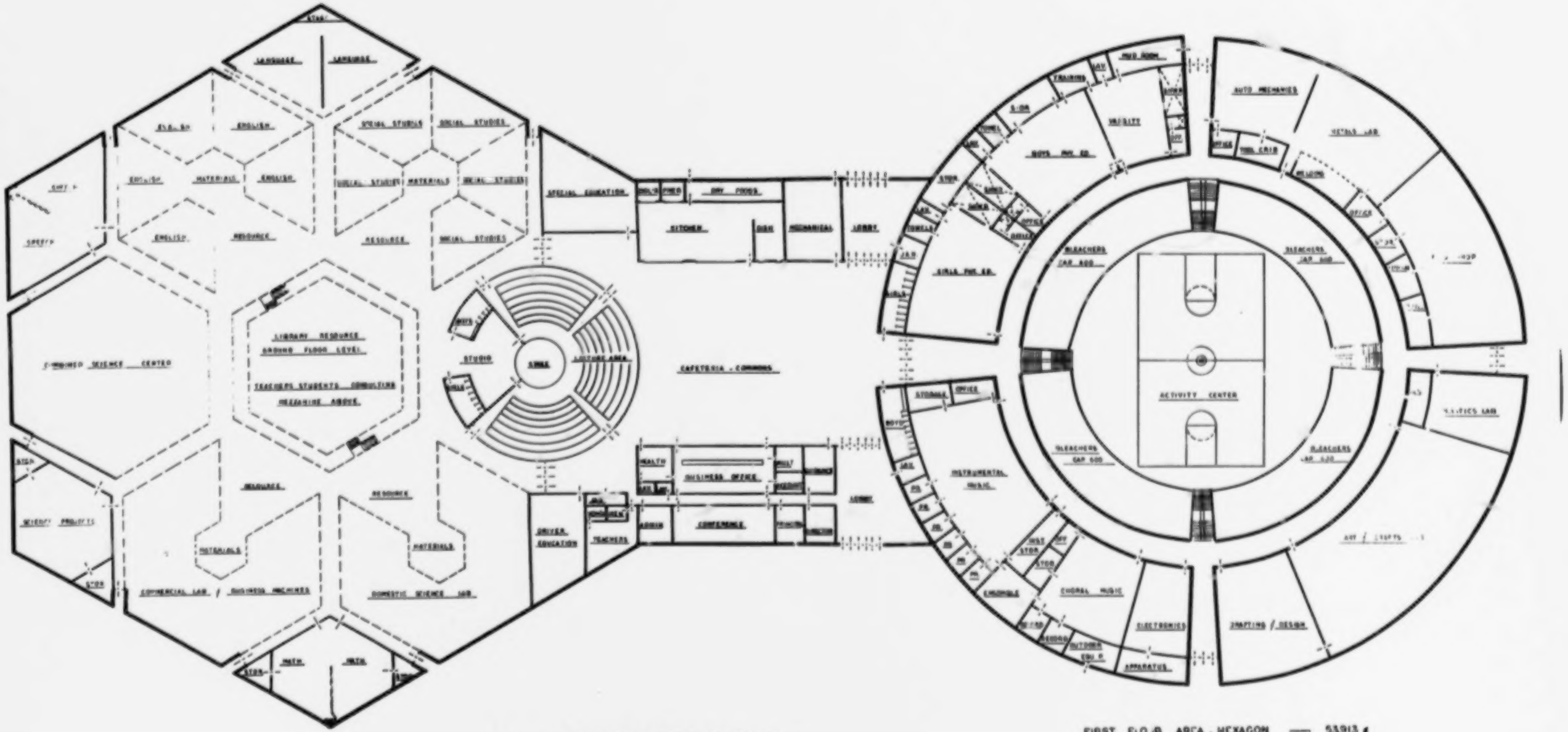
Although the academic area has been reduced by 5,000 square feet, the facility will function nearly as well as in the preceeding plan. One revision which became necessary involves the shape of the Little Theatre. We cannot seat the students as efficiently in the Hexagonal theatre as compared to the Semi-circle. It will not be quite as easy to sub-divide for multi-group activities but this function would not occur very often and, we decided to accept this fact.

Another point of controversy occurred over the inclusion of an area designated as a Planatorium and, because of the reaction of the electoriate; we changed the label. We found similar problems with terms such as: Instructional Materials Center, Olympic Swimming Pool, Little Theatre, Etc. As a result we have reverted back to terms such as: Lecture area, Library, Etc. and we make no reference to "Olympic" in describing swimming pools. We may not appear to be modern in our terminology, but we would rather accept the criticism if it means a successful referendum. The average voter is not prepared, nor is he receptive, to some of our modern terminology.

In the previous plan we encountered a few structural problems because of the irregular shape of the academic wing. The hexagon was not quite complete and the area around the front entrances was not symmetrical and therefore, presented a cost problem which we were determined to correct. This plan represents an improvement and the hexagon is complete thus lowering the cost of the structural system.

Up to this point, we have not discussed the advantages of the open concept in terms of construction time and reduction of time loss due to inclement weather. With the deletion of virtually all of the bearing walls and columns, it is apparent that the roof structure may be erected at a much faster pace than as compared to the conventional structure. This will allow the contractor to enclose the building at an earlier date and, with our four-season climate, this is of particular importance. The bids will be lower and man-hour of labor less which have a possitive effect on a restricted budget. The elimination of walls, doors, hardware, painting, thermostats, etc. will, most certainly, have a similar effect.

Many of the functional aspects of this plan have already been discussed in the preceeding section and, the points mentioned pertain to the plan as well. The third design solution to the Winneconne planning effort represents a completely different approach in the physical activity area.


LANGUAGE
LANGUAGE
ENGLISH
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MATERIALS
ENGLISH
ENGLISH
RESOURCE
SOCIAL STUDIES
SOCIAL STUDIES
SOCIAL STUDIES
MATERIALS
SOCIAL STUDIES
RESOURCE
SOCIAL STUDIES
SPEECH
COMBINED SCIENCE CENTER
LIBRARY RESOURCE
GROUND FLOOR LEVEL
TEACHERS STUDENTS CONSULTING
MEZZANINE ABOVE
SCIENCE PROJECTS
STOR
STOR
RESOURCE
MATERIALS
COMMERCIAL LAB / BUSINESS MACHINES
RESOURCE
MATERIALS
DOMESTIC SCIENCE LAB
STOR
MATH
MATH
STUDIO
STAGE
LECTURE AREA
SPECIAL EDUCATION
DRY FOODS
KITCHEN
DISH
MECHANICAL
LOBBY
CAFETERIA - COMMONS
HEALTH
BUSINESS OFFICE
CONFERENCE
ADMIN
TEACHERS
DRIVER EDUCATION
LOBBY
STOR
TOWELS
JAN
GIRLS PHY. ED.
GIRLS
BOYS PHY. ED.
VARSITY
TRAINING
MUD ROOM
OFFICE
OFFICE
BLEACHERS CAP 400
BLEACHERS CAP 400
BLEACHERS CAP 600
BLEACHERS CAP 600
ACTIVITY CENTER
AUTO MECHANICS
OFFICE
TOOL CRIB
WELDING
METALS LAB
OFFICE
STORAGE
OFFICE
BOYS
JAN
INSTRUMENTAL MUSIC
PR
PR
PR
PR
PR
PR
INST STOR
OFF
STOR
ENSEMBLE
CHORAL MUSIC
ELECTRONICS
OUTDOOR EDU. E
APPARATUS
DRAFTING / DESIGN
ART / CRAFTS
PLASTICS LAB

SECONDARY LEARNING CENTER
WINNECONNE, WISCONSIN
SCALE: 1/16"-1'0"

FIRST FLOOR AREA - HEXAGON	—	53,913 #
FIRST FLOOR AREA - CIRCLE	—	52,252 #
COMMONS AREA	—	14,016 #
MEZZANINE AREA	—	3,400 #
TOTAL AREA	—	124,550 #

STUDY X

- BUILDING TYPE STUDIES -

SECONDARY LEARNING CENTER - HEXAGONAL - CIRCULAR - 43 TEACHING STATIONS

DESIGN CAPACITY 1075

Total Building Area	124,550 Sq. Ft.
Building Area per Student	116 Sq. Ft.
Construction Cost per Sq. Ft..........	12.80
Construction Cost per Student	$ 1,485.00
Total Construction Cost (Estimated)...	$ 1,596,000.00

- LIST OF FACILITIES -

ACADEMIC WING

- Mathematics Class Area (2 units)	53,900 Sq. Ft.
- Science Project Class	1,750 Sq. Ft.
- Speech (2 units)	1,750 Sq. Ft.
- Language Laboratory (2 units)	1,750 Sq. Ft.
- Science Laboratory .... (Lab stations for 80 Students) Includes Lecture Areas, Lavatories, Storage, Etc.	4,940 Sq. Ft.
- English Cluster (5 class areas) .... Includes Resource Area, Storage, Etc.	4,940 Sq. Ft.
- Social Studies (5 class areas) .... Includes Resource Area, Storage, Etc.	4,940 Sq. Ft.
- Commercial Business - Computer Center ... Includes Resource Area	4,940 Sq. Ft.
- Domestic Science .... Includes Resource Area	4,940 Sq. Ft.
- Instructional Materials Center .... (First Floor Level)	4,940 Sq. Ft.
- Instructional Materials Center .... (Mezzanine Level)	3,060 Sq. Ft.
- Little Theatre .... (Capacity 280 Students) Includes Electronics Studio, Storage, Lavatories	4,700 Sq. Ft.
- Special Education	1,200 Sq. Ft.
- Driver Education	840 Sq. Ft.

LIST OF FACILITIES - Continued

VOCATIONAL TRAINING WING - PHYSICAL ACTIVITIES	52,250 Sq. Ft.
- Gymnasium (Seating Capacity - 2,400 Spectators)	16,200 Sq. Ft.
- Locker and Shower Areas	7,800 Sq. Ft.
- Shops, Art, Drafting, Etc. Includes Auto Mechanics, Metals, Woods, Plastics, Art, Drafting, Electronics	16,800 Sq. Ft.
- Music Department Includes Instrumental, Choral, (6) Practice Rooms, Instrument Storage, Offices, Ensemble, (2) Recording Rooms, Outdoor Equipment, Etc.	7,800 Sq. Ft.
- Miscellaneous Facilities -	
Kitchen, Dry Foods, Dish Wash	1,972 Sq. Ft.
Cafeteria - Commons	7,100 Sq. Ft.
Administration - Student Services	3,200 Sq. Ft.
TOTAL USABLE AREA	124,550 Sq. Ft.

DESIGN COMMENTARY:

The third and final proposal for a high school designed to educate 1075 students presents a hexagonal academic unit coupled to a circular physical activity - vocational unit with the result - a reduction in the total square footage and the total cost. A fast comparison between this plan and the preceeding plan clearly indicates that although the total area is less in this plan, the circular plan has actually increased the amount of usable area. This is particularly true of the shop areas which have increased considerably.

The shop areas must be more defined because they are no longer located in a compact area with the art room. This will reduce the functional quality somewhat as the total area will be more difficult to supervise, and materials will not be as readily available for shared use. Accessibility, from both the interior and exterior, is excellent in this plan.

It is planned to recess the gymnasium floor level so that the top of the bleachers are on the same level as the service corridor. In this manner, the bleachers can be loaded from the corridor which is particularly convenient for women and elderly spectators. Direct exits may be provided at ground level directly under the perimeter shop areas and permanent stairways can be included at the four exit locations. The seating capacity and arrangement of the circular gymnasium is of particular advantage in that, with a capacity of 2,400 spectators; there are no bad seats for the spectators. Another definite advantage is the possibility of programing theatre-in-the-round productions for the entire community. We not only gain an excellent gymnasium, but we also have a fine theatre and auditorium for a minimum cost.

DESIGN COMMENTARY - Continued

Although not specifically indicated, it would be quite economical to excavate the periphery of the shop area to provide an unassigned "E" space which can be completely finished at a nominal cost. In the meantime, this "E" space can be used as a work area, rifle range, storage space, large crafts area, outdoor storage and any other purpose to enhance the educational advangages to the student. Obviously the possibilities are unlimited and the space valuable in function but not in cost.

Exhaustive studies have indicated that both the circular area and the hexagonal wing will be very economical to frame, and the economy also applies to the mechanical and electrical work because of the symmetry of both sections. Both areas will have less wall area as compared to the square units of equal floor area. In the circle the wings will be approximately 14.8%, and in the hexagonal portion the reduction will be approximately 7.2% which is illustrated earlier in this booklet. Not only the exterior wall area is reduced but also the footings, foundation walls, roof fascia, roof soffit, heat loss, etc. When all of these savings are totalled, the result clearly gives proof to the claim of economy. More people recognize this logic and, whereas the circle was condemned several years ago; now the acceptance has been extremely favorable.

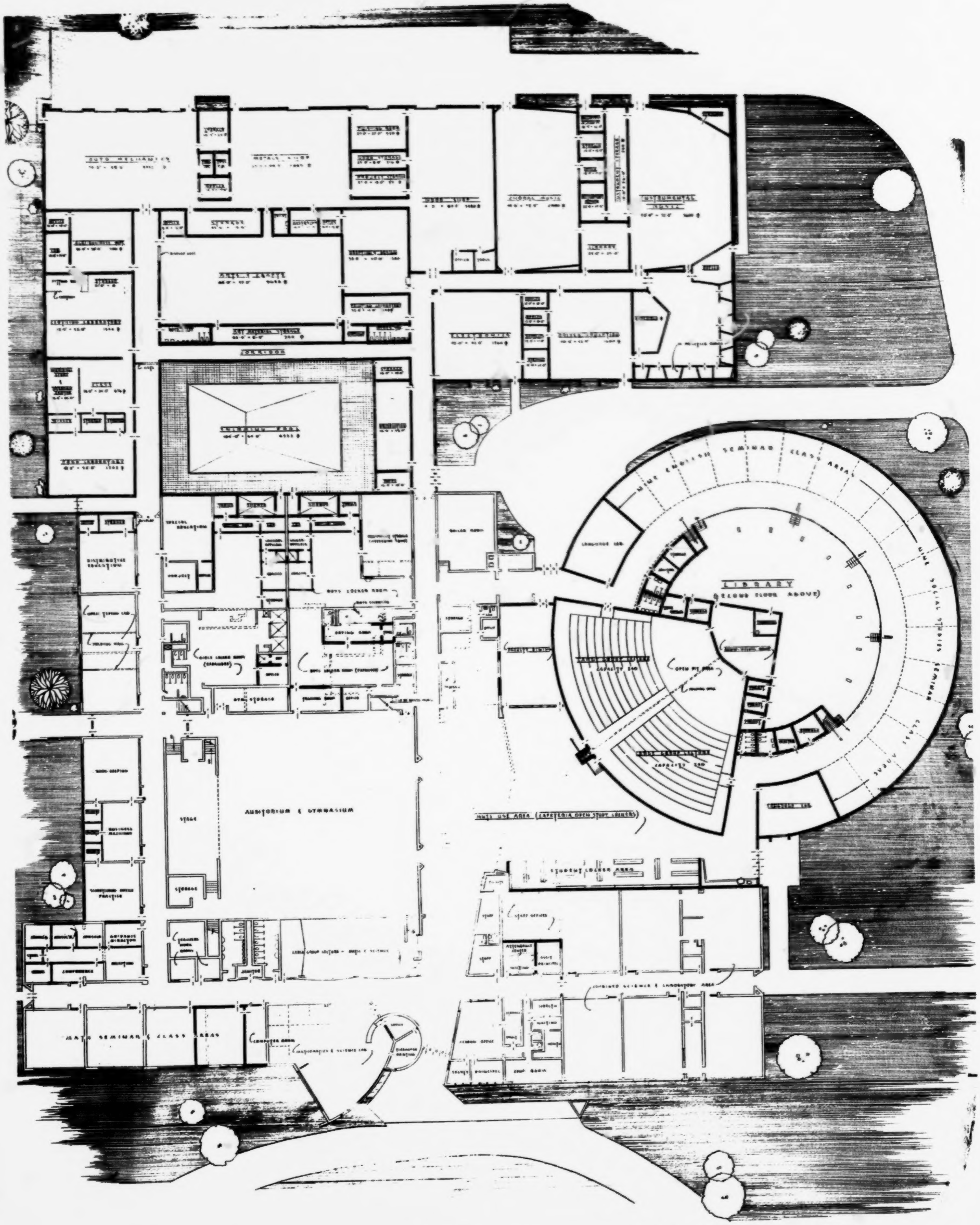
A feature of all the plans included in this text is the design of sloping roof areas which pitch and drain directly to the exterior. Most districts have at least one or two schools with flat roof areas which are nearly impossible to drain - and expensive to maintain. We have found that with a proper design, it is not difficult to acquire a ten year blanket guarantee from a competent roofing contractor. This coupled with annual inspections for a period of ten years will prevent any great problems and subsequent expense to the owner. This statement is not valid with flat roof construction.

The academic area and the function of that area has been well explained in the preceeding commentaries, and we are quite satisfied with the space allocations. If the hexagon is reduced below 50,000 square feet the function will be completely changed and the current class configurations will not be possible. This fact must be recognized by the ill-advised designer that attempts space reduction beyond that point. It would be wise to turn to the circle, square or rectangle if further space reductions are deemed necessary.

In reducing the area of the cafeteria - commons area, the space allocated for the main entrances has also been limited but not to a serious degree. One point of concern however, is the deletion of the separate locker area for the students. This can pose a problem and should be thoroughly evaluated prior to permanently eliminating this space. Wall lockers may be located in the physical education wing corridor but this area becomes quite removed from the academic wing. Lockers may also be included in the resource areas but here again noise and maintenance costs become a problem. The ideal solution must be to locate the lockers in the immediate proximity of the main entrances.

DESIGN COMMENTARY - Continued

A proposed budget of $12.80 per square·foot for construction purposes represents an extremely attractive cost figure. This budget is not only possible, - with proper planning, the budget is probable. There will be many doubters because of the inflationary spiral, but our study has been detailed and we are certain that it can be done. Winneconne may well serve as the proof of these statements as the program develops to reality.


AUTO MECHANICS
METALS SHOP
WOOD SHOP
CHORAL MUSIC
INSTRUMENTAL MUSIC
ARTS & CRAFTS
CORRIDOR
ELECTRONICS
SPECIAL EDUCATION
DISTRIBUTIVE EDUCATION
OPEN TYPING LAB
BOILER ROOM
BOYS LOCKER ROOM
GIRLS LOCKER ROOM (EXPANDED)
BOYS LOCKER ROOM (EXPANDED)
STAGE
STORAGE
AUDITORIUM & GYMNASIUM
BUSINESS MACHINES
GUIDANCE DIRECTOR
CONFERENCE
STAFF OFFICES
STUDENT LOCKER AREA
MULTI USE AREA (CAFETERIA OPEN STUDY CENTERS)
LIBRARY
(SECOND FLOOR ABOVE)
LANGUAGE LAB
NINE ENGLISH SEMINAR CLASS AREAS
NINE SOCIAL STUDIES SEMINAR CLASS AREAS
OPEN PIT AREA
CAPACITY 200
CAPACITY 200
COMBINED SCIENCE & LABORATORY AREA
MATH SEMINAR & CLASS AREAS
COMPUTER ROOM
GENERAL OFFICE
HEALTH
WAITING

HIGH SCHOOL ADDITION & REMODELING PORTAGE, WISCONSIN

SCALE 1/16"=1'-0"

PRELIMINARY STUDY NO. 3

THERN ASSOCIATES INCORPORATED OSHKOSH, WISCONSIN

STUDY XI

- BUILDING TYPE STUDIES -

HIGH SCHOOL ADDITION 58 TEACHING STATIONS DESIGN CAP. 1200

Total Building Area	101,570 sq.ft.
Building Area per student	136 sq.ft.
Construction Cost per sq. ft.....	$ 13.80
Construction Cost per student....	$ 1,585.00
Total Construction Cost	$1,552,000.00

The Challenge: Design an addition to the Existing High School Building in Portage to increase the enrollment capacity from 575 to 1200. The program to emphasize Modular Scheduling and particularly large group-small group teaching methods. Special problem areas include Physical Education, Music, Art and Vocational Training facilities. Additional Problem: Maintain a budget not to exceed $1,750,000.00. Final Problem: Remodel the existing school building to be compatible with the new program and building addition.

DESIGN COMMENTARY:

The basic philosophy in the approach to the design problems listed above is that for every problem, or series of problems, there must be a solution. On the surface, this sounds good, but doing it presents quite a different picture. The solution has not been completely finalized but, we are close enough to it to warrant further discussion of the ultimate goals presented in the basic design.

The Portage project represented one of the first building challenges in which a complete and detailed educational specification precluded the selection of the designer. Too often the only direction given to the designer is to design _X_ facility to house _Y_ number of children. From that point the designer crosses his fingers and proceeds to draw lines with only his experience and past mistakes to guide him. Portage retained the services of an independent educational consultant to work with the staff and prepare a logical and functional educational specification. The results were most helpful and gratifying to all parties directly concerned with the program.

DESIGN COMMENTARY: (Continued)

Open Plan ----- Flexibility -- Versatility -- Compatibility

These terms best describe the stipulations set forth in the educational specifications. The existing structure was to be completely changed thru remodeling but with a very restrictive budget. Open laboratories, team conference areas, specialized materials centers and resource areas were to be inter-related to allow maximum accessibility for the individual student.

The first point of disagreement came to a climax when the teachers requested (strongly) private office areas to the point that approximately 100 offices were to be included. This request, or demand, was in direct conflict with the prime objective of placing the faculty work areas and desk locations in areas immediately accessible to the individual student. I.e., the staff members wished total privacy whereas the functional goal would not allow isolation zones between teacher and student.

Whereas the existing building include more than 70,000 sq.ft. of conventional classrooms and care facilities, it was obvious that these facilities had to be used to their best advantage, but not necessarily for their original intended purpose. It was decided to use the class areas for specialized functions that would not restrict the ultimate use of the total building when completed.

Examples:

- Triple the size of existing science laboratories by absorbing the surrounding class areas, including Home Ec. Remove all walls for open lab.
- Increase the mathematics department, remove walls, and provide open labs.
- Convert the present library to a highly specialized materials resource center for math and science.
- Provide open teachers work areas immediately adjacent to those areas of teacher responsibility.
- Use the existing large group lecture facility for Math-Science and Business Ed.
- Convert the remaining classrooms into a complete and integrated Business and Distributive Education Department to be located close to an independent guidance facility.
- Abandon the existing shops (in total) and convert to additional locker and shower facilities to serve the existing varsity gym, the new swimming pool and the new girls gymnasium.
- Enlarge and expand the present cafeteria to include complete dining, study and milling areas. To be located near the House of Humanities, which would be a totally new building area.

DESIGN COMMENTARY: (Continued)

In summary, the existing building had serious shortages of space in every department except the main gymnasium. However, the remainder of the Physical Education facilities were totally inadequate for 1200 students.

We had eliminated the Social Science classrooms, English rooms, Materials Center-Library, Shops, Music, Large Group, Home Economics, Drafting and Ag Department because of the expansion of existing facilities into areas originally occupied by the departments eliminated. In this manner it became clear that we had determined the use of the existing space and the new addition had to provide new facilities for those eliminated.

The academic (House of Humanities) design specifications called for 18 small group work areas supplemented by at least two large group lecture facilities to accommodate no less than 500 students in lecture table type seating. In addition, we were to provide teachers work areas immediately adjacent to the small group areas to which the teachers were assigned. All facilities were to be equi-distant from and immediately accessible to the central Materials Resource Center-Library. These stipulations clearly indicated that only the circle would provide the answer.

The number of small group facilities and the large group lecture area determined the size of the circle, however one problem developed - we required an area of at least 14,000 sq. ft. for the teachers stations and materials center, and we also desired a separation of specific areas within the total of 14,000 sq. ft. As a result, we decided to recess the materials center at the main level and increase the roof pitch. The result: A materials center - specialized work area of 14,000 sq. ft. but located in a bi-level configuration.

The expansion of the locker and shower facilities presented no particular problem because space was available in the former shop area. Rather than provide additional locker areas in other parts of the building, it was decided to locate the pool in the central portion or inner core. This solution might hinder the potential indoor-outdoor combination, however the value of this usage is highly debatable. The pool itself will pose fewer problems if the walls are not exposed to fluctuating temperature conditions. It is important to mention that the pool will or will not be included, depending upon the final decision of a donor already considering the total sponsorship of this facility.

The Home Economics - Family Living section is quite conventional other than for the maximum space allocated. It was decided that the girls would also use the Ag-Natural Resources lecture area and testing lab to further their knowledge of horticulture and plant life normally associated with future residential type landscaping and care. As a result, five separate teaching stations are available for Domestic Science purposes.

DESIGN COMMENTARY: (Continued)

The orientation of the shops, art, drafting, printing laboratory and auto mechanics became a matter of natural orientation since all of these facilities are inter-related. The close proximity of these individual teaching stations is of particular importance to allow the shared use of equipment and supplies. Each of the shop areas includes at least 3,500 sq. ft. with the art laboratory slightly larger than the individual shops. Mezzanine storage facilities are supplemental to the main shop areas and natural traffic flow patterns have been provided to inter-relate the individual learning stations.

The music department has presented a real challenge and one that has not been completely answered to date. There were several major objectives in the planning: To provide separate choral, instrumental, practice areas and materials center immediately accessible and controllable at all times without disrupting the inter-related facilities. Visual control between areas by means of vision panels was also stressed in the educational specification and, for the most part, this requirement has been satisfied.

In summary, although it is somewhat premature to consider the Portage plan before its finalization, it is believed that the basic solution to a rather weighted problem is worthy of inclusion in this publication. Changes will be made and improvements achieved however, the basic concept has already been accepted by the staff and Board as being both functional and economical. It should solve the problem of doubling the capacity without doubling the cost. The electors will decide the ultimate fate of the building program. Normally we do not consider building additions in this publication, but this project has been of extreme interest to us -- it may be of interest to you.